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JOURNAL OF FARM ECONOMICS

Volume XXXIV

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AGRICULTURAL POLICY: WHOSE VALUATIONS?*

DALE E. HATHAWAY AND LAWRENCE W. WITT¹

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"We already know, of course, that farmers and their representatives are generally opposed to direct aid via Government Check", O. V. Wells, This Journal, November, 1947, p. 1375.

THIS article will raise questions about some cherished beliefs in agricultural policy. We do not intend to answer all of the questions raised; rather we wish to raise doubts as to the validity of some issues and assumptions regarding agricultural policy and its formation which are now largely regarded as settled. Acceptance of certain beliefs among professional circles has strengthened the blocks in the path toward a sound, rational agricultural policy.

Increasingly, agricultural economists, political scientists, and policy leaders are holding to the belief that direct payments to farmers conflict with so many deeply held farmer valuations that their use would be politically unfeasible. Witness the persons who are certain the opposition to the Brannan Plan stemmed largely from opposition to direct payments! Having accepted this mental roadblock regarding direct payments, Congressional policy-makers have had few reservations about the possibility of enforcing agricultural production controls through acreage allotments and marketing quotas. Present agricultural programs as they are written reflect this fear of direct payments. Thus administrators are forced to turn to involuntary production controls in order to prevent producers who do not comply with voluntary controls from benefiting from the higher market prices at the expense of those who comply. This would of course eventually result in a breakdown of the programs.

These basic beliefs regarding agricultural policy have developed pri-

* Journal Paper No. 1379, Michigan Agricultural Experiment Station.

¹ The authors wish to acknowledge the work of Everett Peterson and Duane Gibson in selecting the sample and in formulating and taking the schedule.

marily from discussions with leaders of agricultural pressure groups or with the more vocal farmers. There have been few, if any, attempts to check these valuations with systematic studies of representative groups of individual farm operators to examine their beliefs, valuations, and understanding regarding agricultural price policy. Consequently, the acceptance of statements by farm spokesmen has assumed implicitly that the leaders accurately reflect the beliefs of their members, or that they can sufficiently influence their membership to follow the course the leaders think desirable. The authors wish to present the results of recent research which indicate that these assumptions are not necessarily true, and that while there are many inconsistencies present in the attitudes of farmers, most of them could be removed by improved knowledge since they do not involve the valuations commonly accepted.

The Research Technique

The authors' conclusions are based primarily upon materials gathered as part of a study recently completed in Michigan on farmers' actions under and attitudes toward agricultural price support programs.² A 30-county area of Michigan was chosen for the study, which was limited to the commercial farming areas producing products covered by the post-war price support programs. The area is primarily a cash-crop and dairy production area. Seven counties were chosen to represent this 30-county area, and a random sample was drawn within stratified townships in these counties from the county Production and Marketing Administration records.³ Personal interviews were taken from 500 farmers in the seven counties. Since the sample contained few potato producers, an additional 72 interviews were taken from a sample drawn from the P.M.A. potato list in one of the seven counties. At the time of the interviews farms of less than 70 acres were excluded, so that the sample consisted of the operators of commercial farms. The interviews were conducted by graduate students in the Department of Agricultural Economics who had farm backgrounds. To avoid bias, all interviewers were instructed to ask each question exactly as worded on the questionnaire. Some of the questions were open-end questions and the answers were recorded in the words of the farmer as nearly as possible.

The interviewing was done during August and September, 1950. This was after the start of the Korean War and there had been an appreciable increase in Michigan farm prices by that time. Michigan farmers had

² Additional material reporting on this research may be found in a forthcoming bulletin, "Michigan Farmers and the Price Support Programs," to be published by the Michigan Agricultural Experiment Station.

³ Six of the seven counties are classified by P.M.A. as commercial corn-producing counties, and one (pea-beans) is a cash-crop and livestock area.

been faced with steadily declining prices for their products from January, 1948, to January, 1950, when the index of prices received was 29 per cent below that of January, 1948. Prices had recovered about 10 per cent by the time this study was made, and it was not possible to determine whether farmers were thinking generally in terms of the falling prices they had experienced or of the expected year ahead.⁴

Price Supports and Production Controls

While farmers were about evenly divided on the need for price support programs in 1950, about two-thirds said that the government should stand ready to provide some type of floor under farm prices. Moreover, most of them appeared to favor a high level of price supports. This is additional evidence explaining why the flexible and somewhat lower level of supports of the 1948 Act was revised before going into effect.

At the same time, Michigan farmers were asked about acreage allotments and marketing quotas. A majority opposed acreage allotments which they could ignore at will, and were very opposed to marketing quotas which they could not ignore. Those farmers, recognizing the impacts of marketing quotas upon feed for their livestock enterprise, were nearly three to one against them. Thus greater information through education on the one hand or experience with a program on the other is likely to increase the opposition.

High level support prices under "normal" market conditions lead to voluntary controls. If these controls are not sufficient and if compulsory controls are requested by the Secretary of Agriculture and rejected by the farmers, supports end for all practical purposes. About one-fourth of farmers interviewed said they were willing to accept marketing quotas to achieve more price security, while 62 per cent were definitely opposed to more production controls.

Thus an inconsistency and conflict is apparent in farmers' attitudes. They desire price supports—at high levels—but do not want production controls. There is nothing particularly new or startling in this statement, except perhaps, that these attitudes were not associated with age, experience, debt status, or organizational affiliation. How to resolve the economic conflict apparent in providing farmers substantial price security without compulsory production controls or the need for large government expenditures is outside the purview of this paper. But given a level of support which is politically acceptable as to its possible costs as well as in its price security, can some means of implementation besides diver-

⁴The yearly average purchasing power index of Michigan farm products varied between 104 and 122 during the previous decade but was down to 96 in 1950 (1910-14 = 100).

sion and storage be used which will eliminate the troublesome conflicts with international trade policies; and reduce malallocation between perishable and storable products, particularly in the livestock-feed ratios?

As many agricultural economists have suggested, the use of direct payments would overcome many of the difficulties of the present program. While they have long been recognized, they have not been seriously proposed by many members of the profession since it was believed that farmers have strong valuations against their use. This assumption needs to be carefully reexamined in light of the research discussed below.

Michigan Farmers and Direct Payments

A major portion of this study was designed to examine farmers' attitudes toward proposed changes in agricultural programs and with which they had had no experience. To probe the attitudes of farmers toward direct payments, the following situation was presented to each farmer:

"Two farmers were talking about ways to keep farm prices and incomes from falling too low. Both men agreed that the present plan of price supports for such crops as corn and wheat worked fairly well, that is, having farmers arrange purchase agreements or loans-and-storage with P.M.A. They didn't agree, however, on how perishables like butter and eggs should be supported. One of the farmers, Mr. Benson, said he favored the present method in which the government buys direct from processors and stores the products in order to hold prices up. Mr. Wood, on the other hand, said that he favored a plan under which farmers would sell their perishable products like eggs for whatever they would bring. If these prices were so low that farm incomes would be below parity, then the government would make direct payments to farmers in order to bring their incomes up."

After this explanation of the two support methods farmers were asked:

"As you see it, what are the advantages of Mr. Benson's suggestion that our government continue its present plan of buying direct from processors and storing perishables?

What are the disadvantages?"

Michigan farmers did not find it easy to think of advantages of the diversion program (Table 1). The one given most often, that the program improves farm prices, is an advantage that is not exclusive to diversion programs. Thirty per cent of the farmers said there was no advantage in using the diversion programs to support perishables, and another 30 per cent answered "don't know". This left a relatively small group who recognized and gave valid advantages relative to the present support methods.

Farmers did not have as much difficulty thinking of disadvantages of the present support methods, and more of them gave disadvantages exclusive to the diversion programs (Table 2). However, the largest group

TABLE 1. THE ADVANTAGES OF THE DIVERSION METHODS OF SUPPORTING PERISHABLE FARM PRODUCTS GIVEN BY FARMERS

Advantages	Per Cent
Improves the prices of farm products	20
Costs less and are simpler to administer than direct subsidies	5
Government storage creates a reserve stockpile of food	2
Government purchases stabilize the market	2
Farmers get money for product immediately	2
Helps big farmers and processors	1
Less red tape	1
Other answers	7
Saw no advantage at all in diversion methods	30
Don't know	30
Total	100
Number of farmers	500

objected to the government cost, which of course, is associated with either support program. Many of the farmers worried about the effects of the present support methods on consumption, and about the "surpluses" created by government storage. Some also felt that the programs were not successful in raising farm prices to the support level.

Farmers then were asked if they had ever heard of the direct payments idea. Although 87 per cent of the farmers said they had heard of the "Brannan Plan", only 14 per cent of them knew that direct payments were one of its features. Another 33 per cent said they had heard of the idea, probably in connection with the war-time milk subsidy. Over half said they had never heard of direct payments before. Potato producers were better informed on this issue, possibly as a result of the publicity surrounding the potato supports, as 42 per cent of them recognized direct payments as a feature of the Brannan Plan and another 29 per cent said they had heard of it before.

TABLE 2. DISADVANTAGES GIVEN BY FARMERS OF USING DIVERSION METHODS TO SUPPORT PERISHABLE PRODUCTS

Disadvantages	Per Cent
Costs are too high, wastes tax money	22
Causes waste of food which should be consumed	21
Storage by gov't doesn't really solve surplus problem	12
Helps middlemen not farmers	4
Makes food more expensive to consumers	4
Causes overproduction	3
Not effective in raising prices to farmers	3
Only big farmers helped	1
Other answers	7
Saw no disadvantages at all in diversion method	6
Don't know	17
Total	100
Number of farmers	500

When asked what they thought the advantages of direct payments would be, the answers reflected their lack of familiarity. Thirty-two per cent answered "don't know" and 30 per cent said there were no advantages (Table 3). Of the answers given, most were valid, at least from the farmers' viewpoint. They again stressed the consumer interests, the clearing of the market of "surpluses", and improvement of farm prices.

TABLE 3. ADVANTAGES GIVEN BY FARMERS OF USING DIRECT PAYMENTS TO SUPPORT PERISHABLE COMMODITIES

Answer	Per Cent
Lowers cost of food to consumers, increases consumption	12
Raises price to farmers	9
Clears market	4
No loss to government from storage and waste	3
Reduces waste of food	2
Cuts out processors	2
Other answers	6
Saw no advantages in direct payments	30
Don't know	32
Total	100
Number of farmers	500

TABLE 4. DISADVANTAGES GIVEN BY FARMERS OF USING DIRECT PAYMENTS TO SUPPORT PERISHABLE COMMODITIES

Answer	Per Cent
Will cost government too much	26
Difficult and costly to administer	12
Would cause overproduction	6
Would have too much red tape	3
Would cause too much regimentation	2
Would make farm incomes dependent on Dept. of Agr. & politics	3
Would take too long to get money	2
Other answers	14
Saw no disadvantages at all in direct payments	8
Don't know	24
Total	100
Number of farmers	500

Then the question was asked regarding the disadvantages of direct payments, which should have uncovered any strongly held farmer-valuation against direct payments. However, these valuations were not readily apparent in the answers given by farmers (Table 4). In fact, most of the answers might have come from persons without any valuations toward the matter. The primary disadvantages centered around the higher cost and difficulty of administering direct payments. There were some farmers who failed to recognize that over-production and regimentation are more

closely associated with levels of supports than methods. Very few farmers seemed worried that direct payments would make their incomes dependent upon politics—that phrase that appears so often in the annual resolutions of farm interest groups and has been so readily accepted by political scientists!

Farmers were then asked which method of supports they would prefer for perishables. Their answers are shown in Table 5, and while they indicate a very slight preference for the diversion program, direct payments showed surprising strength for the knowledge farmers had of it. It is interesting to note that potato producers with experience selling

TABLE 5. FARMERS CHOICE AS TO METHODS OF SUPPORTING PERISHABLE PRODUCTS

Choice	Large Sample	Potato Sample
	Per Cent	Per Cent
Diversion methods used at present	34	22
Direct payments to farmers	32	40
Don't know	22	15
Don't want either one	10	21
No answer	2	2
Total	100	100
Number of farmers	500	72

perishables under the present program favored direct payments by nearly a two-to-one margin.

More important than the choice of methods was the association between the advantages and disadvantages of the two methods and the choice made by the farmer. There was a definite association between some of the advantages and disadvantages and a decided preference for one of the methods. This association is illustrated in Table 6, where the advantages of direct payments are grouped with the corresponding disadvantages of diversion programs. In the second section of the table, the advantages of the diversion programs are grouped with the corresponding disadvantages of direct payments. In each case only answers associated with the significant preference for one of the methods over the other are shown.⁵

The groupings in Table 6 show that farmers do hold some rather consistent valuations regarding the support programs, but they are not the ones so widely accepted in policy-making circles. A farmer valuation was apparent against having middlemen benefit from the agricultural price support programs. Farmers who realized that direct payments would eliminate government purchases from processors and handlers were much

⁵ Significant differences were measured by the Chi-square test at the .05 level.

in favor of using direct payments. Farmers also indicated a strong disapproval of wasting food products they have produced. Those who recognized that direct payments would reduce waste or spoilage in government stocks also were strongly in favor of using direct payments. And—contrary to the opinion of some—farmers seemed to have valuations against programs which made food prices higher to the consumer.

TABLE 6. FACTORS ASSOCIATED WITH FARMERS' CHOICE OF METHOD OF SUPPORTING PERISHABLE PRODUCTS

Advantages of Using Direct Payments and Corresponding Disadvantages of Diversion	Method Favored			
	Diversion	Direct Payments	Don't Know	Neither
	Per Cent	Per Cent	Per Cent	Per Cent
Diversion helps middlemen not farmers	10	60	25	5
Direct payments cuts out middlemen	0	88	12	0
Diversion causes waste of food	24	43	25	8
Direct payments reduce waste of food	9	73	9	9
Diversion makes food high priced to consumers	29	41	12	18
Direct payments lowers cost to consumers	15	59	19	7
No advantage in diversion methods	16	43	23	18
No disadvantage in direct payments	13	74	8	5
Don't know disadvantages of direct payments	22	47	28	3
Advantages of Using Diversion and Corresponding Disadvantages of Direct Payments				
Diversion simpler and less costly to administer	67	23	7	3
Direct payments difficult to administer	50	26	12	12
Direct payments cost government too much	35	22	26	17
Take too long to get money from direct payments	46	0	36	18
Direct payments means too much red tape	71	29	0	0
No disadvantage in diversion methods	67	23	7	3
No advantage in direct payments	51	9	23	17
Don't know disadvantage of diversion method	46	31	19	4
Don't know advantage of direct payments	38	22	29	11

At the same time, farmers seemed to have fears of administrative problems involved in direct payments, suggesting a strong valuation against large numbers of federal workers to administer any program. Of course, one of the most widely recognized and deeply held of all American valuations—the great dislike of red tape—was readily apparent in the preference of many farmers for the diversion programs. It is worth noting that valuations regarding the governmental cost of the support programs were not as decisive as were the problems of administration and of “red tape”.

It was most interesting to note that the few farmers who said direct payments would make their incomes dependent upon politics were not decisively opposed to their use. In fact, as many of these farmers favored direct payments as opposed them. Could it be that farmers have more faith in pressure politics than free markets?

Many of those who chose the present method of supports did not know the advantages of direct payments or the disadvantages of diversion. It appears that a better understanding of direct payments might well cause a majority of farmers to favor them. In most cases the choices made by the farmers on this issue appeared quite rational, apparently depending upon their individual weighing of the two support methods. There were few valuations apparent that would not be found among a similar sized group of agricultural economists. Contrary to expectations, no association was found between the method of support chosen and farm organization membership, age, education, political affiliation, years of farming experience, or debt status.

This does not mean that Michigan farmers were ready to embrace the Brannan Plan. Actually they declared themselves about seven to one against it, although the reason for this attitude was not discernible. Few seemed to oppose high support levels, and not many farmers recognized that the higher supports might bring strong production controls. There was no association between the attitudes toward the Brannan Plan and direct payments, so obviously the opposition to the Brannan Plan among the farmers included in this study was not based upon opposition to direct payments, as some have claimed.

The results of this research suggest that the choice between direct payments and diversion programs can be evaluated in an economic setting. According to this survey, farmers are not opposed so much to direct payments as such but rather are concerned with the waste of food products, costs of administering programs, and the impact on the structure and operation of marketing organizations. In the political sphere this work suggests that in choosing a support method for a particular commodity, consideration can be given to economic feasibility without fear of arousing strong farmer valuations.

Implications for Future Policy

At the present time it appears that we may again be returning to an era of a squeeze between prices and rising costs, with consequent pressures for higher price support programs, particularly from the feed grain farmers⁶ This would place heavy dependence upon production controls

⁶ Measures have been passed by Congress to prevent the new parity formula from taking effect for the basic commodities.

to avoid an excessive output. If these events should lead to a collapse of the support programs or complete government control of agricultural production, it will be as a result of the inability of Congress and the administrators to bridge the gap of inconsistencies between the farmers' desire for high-level supports and no production controls. Over a period of time, education would seem the only possible way to remove these conflicting attitudes. If the education is to come in any other way than the experience of participating in an undesirable program, it must come quickly. This presents a challenge to the new field of extension work in public policy and it may be the greatest challenge agricultural extension ever has faced.

Leaving aside the inconsistencies and farmer valuations which do bring about problems in policy formation, let us turn to those which are probably more assumed than real. The major inference that farmers are vigorously opposed to the use of direct payments has resulted from the opposition by some farm interest groups to their use in the postwar support programs. This opposition has been picked up in professional circles and has been explained as having resulted from farmer valuations against direct payments. It is very likely that most farmers have no opinion at all as to the best support method but are willing to leave such choices entirely to the judgment of their leaders.

Under our political system, either in a farm organization or in Congress, our representatives must make countless decisions upon which a majority of their constituents have no strongly held opinions. The leaders then are expected to use their judgment in such cases. It follows that a majority of the opinions that are taken to represent the membership of any major organization actually represent the leaders' opinions, to which a majority of the membership does not object. Of course, if the leaders' opinions are at variance with the membership on too many important decisions the leaders will be removed. Part of the function of leadership then involves convincing members that the over-all position taken by the leaders is in the best interests of the whole organization.

Thus, there is a vast difference between accepting the statements of agricultural leaders on such relatively unimportant things as support methods (to farmers they are probably unimportant) as political expedencies or as representing farmer valuations. If these positions are political expedencies, it means that they are much more subject to change with changing conditions, and it means that a price support program with otherwise acceptable features would not be obstructed as the great art of political compromise comes into play.⁷ If these positions represent

⁷ At a time when appropriations to implement direct payments appeared politically feasible, many farm leaders might shift their position regarding the use of direct payments unless they felt their members had strong feelings against their use.

strongly-held farmer valuations, only a long-term educational program among farmers would make it possible for the leaders to change their positions.

This makes the acceptance of these statements as farmer valuations doubly dangerous. The mere acceptance and building up of these ideas in professional circles may, over a period of time, convince the leaders that farmers are strongly opposed to direct payments. Thus, leaders who otherwise might accept direct payments will continue to oppose them because they feel that their members oppose them. And the acceptance of these statements by agricultural economists gives them the air of futility that is suggested in the opening quotation—a suggestion that “What’s the use, our ideas will never be accepted anyhow.” If improvement in agricultural policy is to remain as one of the major goals of the profession we must continue to ask “whose valuations” when confronted with statements which form an obstacle to a more rational agricultural policy.

A CRITICAL APPRAISAL OF FAMILY FARMS AS AN OBJECTIVE OF PUBLIC POLICY¹

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A VAST majority of people throughout the world are convinced that the family farm is a desirable objective of public policy. General acceptance of this concept suggests that it reflects values ranked high among the ultimate ends people strive to attain. This, in itself, is sufficient reason to examine the adequacy of the family farm as an aim of public policy; especially since it is frequently cited as being symbolic of the American way of life.

The Problem of Definition

The phrase "family farm" is used so widely that both popular and scientific definitions must be examined:

1. *Popular definition:* The public has never precisely defined what is meant when the words "family" and "farm" are used together. Each individual defines the phrase differently. Farmers think of it as the farm on which they live, or would like to acquire. Others consider it as the place of their youth. The phrase "family farm" meets the requirements of political slogans or dogmas, because it implies values held in high esteem by many people and yet the lack of clear definition precludes the possibility of differences in opinion that tend to cost candidates votes.

2. *Scientific definition:* Social scientists are not in full agreement on a definition of the family farm. A conference called for the express purpose of studying "family farm policy" failed to develop a definition acceptable to all participants.² More recently one student of the family farm accepted a definition developed by a group of religious leaders.³ The United States Department of Agriculture classifies family farms into four groups by three economic criteria: value of product, value of land and buildings, and work off farm by operator.⁴ However, most students of family farm

¹ Florida Agricultural Experiment Station Journal Series, No. 64. This paper was read before the Agricultural Economics and Rural Sociology Section of the Association of Southern Agricultural Workers in Atlanta, Georgia, February 5, 1952.

² Joseph Ackerman and Marshall Harris, editors, *Family Farm Policy*, University of Chicago Press, 1947, pp. 385-404.

³ John F. Timmons and William G. Murray, *Land Policies and Problems*, Iowa State College Press, Ames, Iowa, 1951, Chap. 12.

⁴ Kenneth L. Bachman and Ronald W. Jones, *Sizes of Farms in the United States*, United States Department of Agriculture, Washington, Technical Bulletin 1019, July, 1950, p. 54.

policy do not consider all farms operated by families desirable.⁵

That the family farm has escaped precise definition may be highly significant for two reasons:

First. Some concepts defy definition because they consist of an amorphous group of heterogeneous ideas. If this is true of the family farm, more attention must be placed on identifying the components of the concept.

Second. Ends and means of attaining ends are being confused. This is clearly stated by those who say, "We feel impelled, however, to avoid the common mistake of looking on the family farm as an end of public policy rather than an instrument through which agriculture and rural life can be made a richer and more satisfying experience for those who farm, and a stronger institution in the American economy."⁶ This indicates these authors believe that the family farm is a socio-economic institution that has made it possible for people to attain a group of vaguely defined ends.

For these reasons, no effort is made here to define the family farm further. Instead, attention will be focused on trying to find out what farm families really strive to attain.

Assumptions

First, we assume the family farm to be a socio-economic institution that generally changes to accommodate changes in (1) wants and desires of people, (2) availability of raw materials, and (3) technology used to convert raw materials into useful goods. In other words, the family farm is a dynamic institution whose form and usefulness is constantly changing.

Second, we assume that the ends people attain from the family farm consist of a mixture of political, ethical, and economic values. This is not a new idea but one that has not been examined as scientifically as have the narrower concepts that lie within the confines of single disciplines.⁷

Third, policy is assumed to mean a plan or course of action to attain one or more ends or objectives that a group of people establish as desirable. Here we are primarily concerned with public policy.

Fourth, the ultimate ends of public policy are assumed to be the social

⁵ Ackerman and Harris, *op. cit.*, p. 390.

⁶ *Ibid.*, p. 390. See also T. A. Schultz, *Production and Welfare of Agriculture*, Macmillan, New York, 1950, p. 30.

⁷ Professor Raymond J. Penn, Head of the Department of Agricultural Economics, University of Wisconsin, states: "It is unfortunate that many economists have dropped the concept of 'political' in current thinking." Timmons and Murray, *op. cit.* pp. 220-221. The import of the ethical values of family farming have been recognized formally by Home Missions Council, the Federal Council of Churches, and the International Council of Religious Education, *Ibid.*, p. 206. Also see Ralph A. Felton, *Proceedings of the 10th Annual Conference of Professional Agricultural Workers*, Tuskegee Institute, 1951, pp. 75-77.

and economic well-being of the nation as a whole. This assumption, in effect, (1) rejects the philosophy of agricultural fundamentalism,⁸ and (2) accepts the desirability of an integrated and expanding economy to promote the social and economic well-being of the nation as a whole.⁹

Fifth, in a democracy we assume that individuals endeavor to attain ends that differ both qualitatively and quantitatively and vary with age, educational achievement, political situations, religion, and other factors. In this context, public policy consists of the ends that individuals can agree as being mutually desirable.

Analytical Approach

Within this framework, we will examine the family farm, with the analytical assumptions or hypotheses suggested by the late John R. Commons.¹⁰ These are sovereignty, scarcity, efficiency, futurity, and custom. Our attention will be focused on (1) finding out what values families derive from family farms, (2) whether these values are genuinely different from the values other families endeavor to attain, and (3) whether the values people strive for on family farms are more desirable policy objectives than the family farm itself.

Sovereignty

Human beings use social organizations to obtain the advantages and satisfactions of collective action. The family was the first and is still the basic unit of social organization. To obtain the advantages of collective action, families use three kinds of power—physical, economic, and moral—the same tools that all social groups use to govern the action of their members. In the language of modern jurisprudence, duress is the physical power of violence, coercion the economic power of scarcity, and persuasion the moral power of propaganda.

Sovereign states use their monopoly of violence to define and protect property. In America, the sovereign state (first England and later the

⁸ Joseph H. Davis, *On Agricultural Policy, 1926-1938*, Food Research Institute, Stanford University, California, 1939, Chap. II.

⁹ See the Employment Act of 1946, Public Law 304, for a broad statement of policy objectives of this kind.

¹⁰ John R. Commons, *The Economics of Collective Action*, Macmillan, New York, 1950, pp. 73-114. It may well be that other analytical tools will eventually prove to be more useful. A psychological approach has attractive possibilities. This use of Professor Commons' assumptions does not in any way imply that he would have used them in this way, or that he would have reached the same conclusions. In fact, there is one important difference in approach, to wit: Commons suggests the use of these tools to interpret economic activity. I am, in effect, saying that all human action has some economic content, the other components being political and ethical; and that these components are inseparable. It is not known whether Commons would have agreed.

United States) expanded the institution and encouraged private ownership of property. Even before the Revolution corporeal property was defined to include all physical things that were scarce. The "obligation of contract" was recognized as incorporeal property and established as such in the Constitution. Finally, intangible property was recognized and the right to use it protected.

When the family farm originated in the United States, land was the only type of property that could be readily acquired. At that time, the right to use land enabled a family to satisfy the basic human motivation to possess or dominate, and to produce the goods needed to subsist and raise their level of living. Consequently, about 90 per cent of the people lived on farms and were able to satisfy these objectives simultaneously. Here we will concentrate attention on three questions:

(1) How effectively does the family farm satisfy the desire to possess or dominate? Farm ownership or the right to use farm land under reasonable tenure arrangements provides families with many opportunities for acquiring or creating things for many reasons. Some are primarily economic and others have little economic value. For example, farmers have a wide variety of opportunities to do many things not classified as earning a living. They may improve their homes, hunt or fish, or raise plants and animals because they like them.

(2) Do other forms of property satisfy the desire to possess as well as the family farm? Approximately 33 million non-farm families in the United States endeavor to use other forms of property for this purpose. Several million of them own homes; others own cabins, boats, books, paintings, as well as stocks, bonds, buildings, patents, and other forms of property.

Are the values that flow from possession of family farms superior to those derived from the ownership of other types of property? It would be difficult to answer in the affirmative. As civilization progresses, the wants and desires of people increase both qualitatively and quantitatively. To enable people to satisfy them, society creates a larger amount and a greater variety of property, and new forms of social organization to use it. Whereas at one time the family farm was one of a few institutions that enabled people to satisfy their diverse wants and desires, now there are several. This means that families can now choose between the several socio-economic institutions to attain particular ends.

(3) Do family farmers tend to value the freedom that land ownership provides more highly than improving their standard of living? Farmers endeavor to retain as much freedom as possible. When other groups use powers of coercion and persuasion to gain what appears to be an "unequal" share of the social product, farmers turn to government for pro-

tection. The Granger movement, anti-trust laws, and parity price legislation are all examples of the farmers' use of the sovereign government's monopoly of duress to protect the freedom and independence provided by land ownership and the right to use land.

In contrast, non-farm families have surrendered some individual freedom to voluntary non-sovereign governments such as corporations, co-operatives, and labor unions. In return they have received the benefits that accrue from specialization and trade. In other words, they have made what they believe is a reasonable compromise between (a) the satisfactions that flow from freedom and independence, and (b) a larger number and variety of satisfactions that flow from group action.¹¹

Does this mean farm families value freedom and independence higher than non-farm families? To some extent it may, but many farm families would gladly surrender some freedom and independence for a larger share of the social product. The rural-urban migration trend demonstrates this. How many non-farm families are willing to take a smaller share of the social product in return for the independence and freedom many farms afford?

Here we need more information on how highly farmers value their individual freedoms. Do they really value freedom and independence more highly than a larger share of the social product; or is the real problem a lack of opportunity, or the inability of some farmers to participate in other forms of social organization? This suggests a series of case studies of why families move from the farm to urban areas and vice versa.

Each family, within the limit of its ability to contribute to the productive process, must decide what constitutes a reasonable compromise between freedom and independence and a larger share in the social product.¹² In this context, those that value freedom and independence highly will create no serious social problem until land becomes more scarce, or

¹¹ See K. Brant, "Toward a More Adequate Approach to the Farm Tenure Program," *This Journal*, Vol. XXIV, 1942, p. 208, for a similar point of view.

¹² We are not overlooking the fact that during the past century both farm and non-farm families have formed new social organizations for the express purpose of equalizing their bargaining power in the market place in which freedom and independence is traded for a larger share of the social product that in turn provides (or is intended to provide) still more freedom and independence. By operating at all levels of government, both public and private, these social organizations (pressure groups) play an important role in the formulation of public policy. However, the fact that they are organized along occupational lines rather than representing cross sections of public interest limits their usefulness in policy determination because it tends to narrow the area of policy formulation. It may well be that the current trend in centralization of public government is the inevitable result of centralizing private government into occupational institutions.

until they ask for a larger share of the social product than they produce. The only way inefficient producers can have both is through subsidies.

Scarcity¹³

Scarcity originates in the fact that the natural environment does not provide enough raw materials to satisfy all of the wants and desires of people. In capitalistic societies, the institution of property is altered and expanded to cope with the ever-changing problems of scarcity. Since the family farm is based on property rights in land, society will constantly appraise the adequacy of that socio-economic institution to cope with problems growing out of the use of scarce land.

History provides some clues about how problems growing out of a scarcity of land may be solved. About the turn of the century the public began to realize that (1) all land was becoming scarce, and (2) family farms and fee simple ownership might not make the most desirable use of forest, range, and recreational land. Now there is rather general agreement that the family farm does not maximize the use of all forest land.¹⁴ Similar problems are arising in the use of range land.¹⁵

This indicates that when agricultural land becomes more scarce, the only alternative to family farms and fee simple ownership we know much about is government ownership. Society has been more ingenious in solving the problems associated with other factors of production that are scarce. Corporations and cooperatives are man-made institutions designed to utilize scarce capital, technology, and labor. These organizations are far from perfect, but in some instances are more desirable than either family economic units or public ownership.¹⁶ In fact, many people think

¹³ Here we assume the dynamic nature of resources and that scarcity is a relative term. Under this assumption the scarcity of land is especially significant because (1) land provides some unrenewable resources, and (2) the span of time required to renew soil fertility and some of its products is often long. For an excellent discussion of this, see Erich W. Zimmerman, *World Resources and Industries*, Harper, New York, 1951, Chapters I and II. A somewhat different, but not inconsistent, point of view was outlined by the author in a paper titled, "Resource Patterns in Southern Industry," *Bulletin of the Bureau of School Service*, University of Kentucky, Vol. 20, No. 4, June 1948, pp. 95-112.

¹⁴ One of the current problems in this field is to develop effective means of increasing the productivity of the timber land that is now owned in "small" tracts. Here "small" means 5,000 acres or less. *Forests and National Prosperity*, United States Department of Agriculture Forest Service, Miscellaneous Publications 668, August, 1948.

¹⁵ Timmons and Murray, *op. cit.*, Chap. 7, and especially Renne's statement that "Much of the acreage in western range land is not suitable for division into units for single operator control," p. 115.

¹⁶ It has been suggested that cooperatives and corporations both strengthen the family farm. In some respects they have, but they also represent further specializa-

of them along with family farms as being typical of private enterprise.

When agricultural land becomes more scarce, the public will assert a more positive interest in conservation and productivity of soil. The modern concept of conservation is wise use in the long-run public interest.¹⁷ How well do family farmers conserve soil? The answer is not yet clear. Some find it to their advantage. Others deliberately exploit the land.

Of the methods of increasing land productivity, the availability and control of water is probably the most important. With respect to its availability, water now occupies about the same status land did a century ago. Land was then almost a free good, but scarcity was in sight. So it is with water now. What kind of socio-economic institutions make the best use of water, and how will they affect the family farm?

Will the public delegate all of the responsibility for conserving and increasing the productivity of the soil to three, four, or five million individual farm families? Certainly the family farmers are in the best position to do the job if they have adequate technical information, and if they find it in their own self-interest. The task of supplying the information falls largely on the USDA and the land grant colleges. Yet these organizations have developed much more technical know-how on both subjects than is being applied.

We seem to know more about how to increase land productivity and conserve soil than about arranging social institutions to make them serve both public and private interests simultaneously.¹⁸ Drainage districts, soil conservation districts, and Tennessee Valley Authorities all constitute efforts to accomplish this. Perhaps society should expend more creative energy on developing social organizations that will resolve this problem. Reconciling the short and long-run interests in scarce land resources is of fundamental importance, and the role of the family farm in it is not clear.

Efficiency

Problems created by the scarcity of land can be partially solved by increasing the efficiency of using land to produce useful goods. By employing more capital, labor, and technology, people have been able to improve their level of living with a limited supply of land.

The general trend toward specialization and trade is altering the efficiency of family farms. The comparative advantage for farmers to pro-

tion and hence decrease the number of economic opportunities on the farm. See text under "Efficiency."

¹⁷ See Bushrod W. Allen and Ellery A. Foster, *Farmers in a Changing World*, 1940, Washington, p. 421.

¹⁸ Professor Penn suggests five alternative approaches to this problem. Ackerman, and Harris, *op. cit.*, p. 229. Also V. Webster Johnson, *ibid.*, p. 241, for six ways of altering the use of land.

duce raw material is increasing while their comparative advantage in processing on the farm is decreasing. At the same time, the comparative advantage of specific geographic areas for specific commodities is becoming more pronounced. Consequently, the number of economic opportunities for families to produce many things efficiently on one farm is decreasing.

Some students of policy feel that family farms may not be an efficient form of social organization for producing some commodities.¹⁹ Furthermore, current agricultural research indicates that further specialization may be desirable. The time may soon arrive when the only enterprises farm families can operate efficiently will be those making a relatively uniform use of labor throughout the year.

On farms that do not provide sufficient economic opportunities for members of the farm families to work efficiently throughout the year, what are the alternatives? Corporations and estates are frequently suggested. One of the objections to both is that the participants must surrender a considerable portion of their right to use economic and persuasive power as they choose. This in turn is alleged to be undemocratic on the grounds that it would require the formation of agricultural labor unions and make collective bargaining necessary to protect the rights of farm workers.²⁰ However, if the surrender of some economic and persuasive power is undemocratic and undesirable, then is not the surrender of the power of persuasion by farmers to large farm organizations also undesirable?

We assume here that corporations and estates are not the perfect answer to the problem of increasing efficiency in agricultural enterprises, and explore three alternatives:

(1) *Industrialization*.²¹ The steady decline in number of farmers and the rapid increase in non-farm population can be partially attributed to an increase in the productivity of farm labor and partially to an increased number of non-agricultural economic opportunities. Furthermore, the number of farmers that work 100 or more days in non-agricultural employment is increasing rapidly. What is happening to agriculture in communities in which erstwhile, strictly farm families are now earning incomes from both agricultural and non-agricultural sources? There are in-

¹⁹ Ackerman and Harris, *op. cit.*, p. 392.

²⁰ For conflicting points of view, see Rainer Schickele, in Timmons and Murray, *op. cit.*, Chap. 2; and A. Whitney Griswold, *Farming and Democracy*, Harcourt Brace, New York, 1948—especially p. 204.

²¹ It is interesting to note that the World Land Tenure Conference put the first priority on this approach. United States Department of Agriculture, Office of Foreign Agricultural Relations Preliminary Report of the Steering Committee, mimeographed 1951.

dications that these families enjoy a more satisfactory way of life than families operating small farm units.²²

However, all farm families do not have opportunities for non-agricultural employment. This may not be an insurmountable barrier since (a) businessmen seek new locations with a potential labor supply;²³ (b) there are several non-agricultural enterprises that can be combined with farming such as tourist homes, fishing camps, gasoline stations and others; and (c) modern transportation facilities enable farmers to travel considerable distances during parts of the year to maximize income. Perhaps we should be examining industrio-agricultural families as a socio-economic institution.

(2) *Production planning.* Farmers living close to each other have much to gain by planning production together. A marketable volume of a uniform quality of any commodity produced in one community will sell at a higher price than small lots produced over a larger area. For example, egg prices are higher in the areas that produce large volumes of eggs than where egg production is low and scattered when supply exceeds demand. If farmers can work out social organizations that facilitate producing a marketable quantity in a small geographic area, and reducing costs of assembling and selling, the farming operation can be made more efficient.²⁴ This presents a challenge for social scientists to develop methods of production planning that will enable farm families to maximize efficiency through some type of group action requiring the surrender of the minimum amount of individual freedom.

(3) *Managerial agreements.* The investment required to establish an efficient farm is increasing because real value of land increases when population increases in a fixed geographic area, and more capital goods are required to produce efficiently. To date, the problem of acquiring capital has been successfully met at the policy level by a liberal extension of farm credit at nominal rates. However, serious problems are arising out of the difficulties encountered by one generation of a farm family in accumulating enough capital to operate an efficient unit. At the farm level this focuses attention on inheritance laws and the type of managerial arrangements that are utilized.

Existing inheritance laws tend to break up farms into smaller and often

²² Bachman and Jones, *op. cit.*, p. 45.

²³ The author has seen this point amply demonstrated by businessmen seeking industrial locations in the Tennessee Valley. By and large these businessmen are not seeking cheap labor. Instead, they are looking for a number of things, including labor that can produce efficiently. In other words, they are seeking ways and means of lowering the unit cost of production rather than lower wage rates.

²⁴ Marketing cooperatives often have the solution of this problem as an objective but frequently fail to solve it because they do not provide an effective mechanism for production planning.

less efficient units. To avoid this, a farm must either be sold as a unit, or one heir must buy out the others by accumulating mortgage obligations often in addition to encumbrances already on the land. This makes it difficult, if not impossible, for one heir to obtain enough working capital to continue the operation. The only way a family can acquire capital is to reduce their level of living until the principal is paid. Yet one of the criteria that has been proposed to judge the desirability of a tenure situation is, "A person with the necessary training and experience should not be barred from farming because of lack of capital, and capital accumulation should not be attained at the expense of family living."²⁵ To what extent can increasing efficiency continue to offset increasing capital costs?

In the past, mortgages, leases, and rental arrangements have served as devices for assembling enough capital to operate a farm efficiently, and much tenure research has been done on these arrangements.²⁶ However, this approach has definite limitations because of land owners and farmers shifting to newer type managerial agreements such as (a) contracts that specify capital, labor, and management inputs and returns; (b) employment contracts providing a minimum wage and a share of the profits; and (c) employment or retention of professional managers.

Relatively little research has been done on the merits of these agreements, largely because they are not now used widely enough to be "significant" in statistical samples. Yet they may prove more effective as a means of increasing the efficiency of farming than corporations, cooperatives, or family ownership of all of the factors of production. The principal questions are: Is the ownership of land more important than the ownership of other factors of production? And, if not, how can several people owning property of one kind or another assemble it into an efficient production unit and retain participation in management?

Finally, we must recognize that technological, economic, and political conditions are changing rapidly and alter the conditions under which efficiency can be attained. To cope with this dynamic situation and keep efficiency as one policy objective, we must make an orderly change in our socio-economic institutions and not fix them as a policy objective *per se*.²⁷

Futurity

Our task here is essentially to determine whether or not there are alternate ways of satisfying four futurity values:

- (1) *Security against changes in the value of currency.* Until a monetary

²⁵ Ackerman and Harris, *op. cit.*, p. 10.

²⁶ See B. H. Kristjanson and S. W. Voelker, "Legal Aspects of Renting Farms in North Dakota," Bulletin 376, N. D. Experiment Station, Fargo, June, 1951. This is typical of a number of very useful publications from different Experiment Stations.

²⁷ See Murray R. Benedict's comment on efficiency, Ackerman and Harris, *op. cit.*, pp. 128-129.

system that provides a uniform measure of value over time is perfected, security against inflation and deflation will be an objective of most families.

Land values fluctuate with the value of currency. This means that when the owners of farm land are forced to sell at deflated prices, land ownership may not be superior to any other type of investment for the attainment of this kind of security.²⁸

As security against fluctuations in currency value, land ownership does enable farmers to subsist when other social organizations can produce nothing. However, society is now so highly specialized many non-farm families would find it difficult, if at all possible, to survive even if they had access to the use of land. Those who could survive on land without the products of all other social organizations would do so at a drastically reduced level of living. In trading some economic freedom for a larger share of the social product, some individuals have probably lost their ability to cope with adversities.

Yet people can make a fuller use of nature by specializing and working together in social organizations. This indicates that land ownership or the right to use land has special value as a means of survival only when the economic system fails to function properly. One question remains: Will the nation ever accept the lower level of living that a drastic deflation and a heavy "back to the farm" movement would involve? Many people think not and believe that other means of attaining collective action would be employed.

(2) *Security in old age.* Farm families look forward to the time they can relinquish management to children, rent or lease the land, or sell the farm and retire. This is satisfactory for farmers who have used soil that was productive enough to permit the accumulation of substantial savings in cash, equity in, or title to land.

Much land is still productive enough to enable a sole owner to retire outright by selling or renting the farm. This partially explains the high percentage of tenancy in the Midwest where tenant-farmer incomes are often higher than owner-operator incomes on less productive land. On land that has low productivity, farmers find it difficult to acquire security in old age, and those that accumulate savings in the form of land frequently find it necessary to charge rents that are high in respect to productivity. Others farm less intensively and reduce their level of living in old age.

Are the alternatives of land ownership for old age security more attractive? Many farmers, who frequently invest savings in non-agricultural

²⁸ Liberalizing credit policies of agencies lending public funds does alleviate this problem but at the same time injects government further into economic life.

securities, believe they are. Some prefer this form of investment to land ownership and remain in the tenant status throughout their productive life. In contrast, business and professional men often buy land out of earnings in non-agricultural enterprises.

Both farmers and non-agricultural workers who earn low incomes find it difficult to accumulate savings for old age security. Of these, non-agricultural workers have social security whereas farmers who perform the entrepreneurial function do not. Thus, many family farmers who use land of comparatively low fertility and operate inefficient enterprises really have an inferior type of old age security.

(3) *Investment.* A constantly declining land-population ratio increases the value of land with respect to the value of the factors of production that are becoming more plentiful. How many farmers have acquired savings from the increased value of land in contrast to the number who have accumulated savings solely from the production of agricultural commodities? Is it in the public interest to reserve this type of investment for family farmers? A good case can be made for this on the grounds that farmers assume more risk and uncertainty than non-agricultural entrepreneurs. Yet it has never been adopted as public policy.

Another point of view is that large investments are necessary to make land more productive, and non-farm savings is a potential source of these funds. If this is true, investment in agricultural land by non-farmers can increase the volume of food and fiber produced. Any policy that would limit the freedom of any individual to invest in property of his own choice would restrict the flexibility of the institution of property and the freedom of people to engage in enterprises of their own choosing.

(4) *Occupational security.* Farm families value land ownership or long-time lease or rental agreements because either will insure them an opportunity to work. Non-agricultural workers seek the same value through seniority clauses in labor contracts. In some respects, attaining this value retards social and economic progress, especially when it is attained at a cost of decreasing efficiency or of retarding the adoption of new technology. On the other hand, many people cannot obtain other values or ends without some degree of occupational security, e.g. education for the children, home ownership, and other factors. The family farm fulfills this requirement in agriculture quite effectively. The questions here are: How much can society afford to pay for it in terms of efficiency? And could other kinds of socio-economic institutions provide the same values at lower absolute or social costs?

Custom

Custom is a similarity of behavior that continues essentially unchanged. As long as any given form of behavior is rational, it serves society well be-

cause it saves the time and energy required for people to formulate a specific plan of action to meet each and every situation. Once established, however, customs tend to lose their rational characteristics due to the ever changing nature of sovereignty, scarcity, efficiency, and futurity values. When customs fail to provide an effective means of coping with new situations, they retard social and economic progress.

Every society and social group develops a web of customs. These customs cannot be changed easily or rapidly because a majority of the group must agree to the change, and the process of breaking old habits and forming new ones is time consuming.

In many respects the family farm is a custom. And farmers frequently ask government protection rather than developing a rational solution to everchanging ethical, political, and economic situations. In other respects the family farm has contributed much to the alterations of old customs and development of new ones.

Many farm families have broken the custom of family farming by educating their children for other occupations. Our policies of education have facilitated this trend. The process is still going on, but the tempo of economic activity is now so rapid there is not time for many families to follow the procedure. For example, some family farmers are not able to earn a reasonable living and give their children an education that will equip them to alter the custom. As a result, the heads of families often find it necessary to leave the farm at middle age or over—when it is difficult to enlarge farms, mechanize, change crops, and make other changes required to cope with new ethical, political, and economic situations.

To retain the family farm on grounds of custom alone would constitute a sharp deviation from principles upon which the nation was founded, especially the freedom to apply initiative and enterprise. Initiative is the germ, and enterprise the action of change. If there is any one symbol of the American way of life, it is more likely to be the flexibility of custom and ability to change. Yet custom cannot be changed quickly. To leave the family farm out of our policy considerations would be as catastrophic as retaining it in its present form. Solution of this apparent conflict in ends is orderly change—change that can be made without making any group bear an undue burden of the cost of doing things for which they were not wholly responsible. The establishment of ends rather than means of attaining ends as policy objectives will free society to concentrate more attention on developing the socio-economic institutions that will facilitate attainment of these ends in an orderly and satisfactory manner.²⁹

²⁹ Here we recognize the significance of the observation, "To be interested in ends and have contempt for means which alone secure them is the last stage of intellectual demoralization." *John Dewey's Philosophy*. Ratner, Modern Library Edition, p. 494.

Conclusions

This brief and incomplete analysis enables us to draw only tentative conclusions:

(1) Families endeavor to attain a wide variety of values through the socio-economic institution commonly called the "family farm."

(2) These values have political, ethical, and economic content. Families do not classify values neatly into these categories; hence values reflecting all of these considerations simultaneously may be more useful than those classified by academic standards.³⁰ Some values suggested are (a) freedom and independence, (b) conservation of scarce resources, (c) efficient production, (d) security, and (e) orderly change. Other studies along these lines would refine and perhaps extend this list.

(3) The values family farmers endeavor to attain are basically the same as those of non-farm families. For this reason, serious consideration should be given to adopting these values as policy objectives, rather than one of the socio-economic institutions that has been reasonably satisfactory in attaining some of them. This would enlarge the area of freedom for families to choose among several socio-economic institutions in attaining their own personal policy objectives and strengthening the democratic process. In effect, this approach would focus attention on inconsistencies in public policy that are the inevitable result of "pressure groups" endeavoring to improve the economic and social status of one occupational group of an integrated and interdependent society.

(4) Difficulties encountered in defining the family farm render it undesirable as a policy objective for administrative reasons. Establishing the family farm as a policy objective calls for a precise definition of the phrase. This in turn would stifle some initiative and enterprise to alter the institution, and call for more centralized planning to interpret the policy. On the other hand, setting up the values as policy objectives would facilitate individual planning in the public interest.

(5) Using values as policy objectives could stimulate the creation of a more desirable socio-economic institution incorporating the desirable features of the family farm. For example, farmers may find some division of management responsibilities between two or more families is more desirable than retaining the management functions entirely in one family. Likewise, it may be more satisfactory for families to own part of the production factors rather than the entire enterprise.

³⁰ Committee I of the Farm Tenure Conference, (Ackerman and Harris, *ibid*, pp. 385-403) does distinguish between political, social, and economic values. This distinction is useful to students of policy, but it is possible to go farther and identify some values that a majority of people will agree are desirable policy objectives.

Finally, we must recognize that responsibility for formulating public policy lies with the people themselves. As social scientists we are responsible for providing them with tools to do this. This suggests a need for developing ways and means of presenting policy problems to the public clearly and objectively and stimulating everyone (not just farmers) to think about them. Revival of the town meeting is one suggested means of doing this.³¹ Michigan State College and a few other land grant institutions are approaching the problem somewhat differently.³² Nevertheless, before any of these educational devices can be really effective we must know more about the true nature of ultimate values people are endeavoring to attain.

³¹ H. C. M. Case, "Farm Policy Problems in This Era of Tensions," *Illinois Farm Economics*, No. 197, October, 1951, p. 1229.

³² See series of publications titled "Open Meetings on Agricultural Policy" published by Michigan State College, Department of Agricultural Economics, East Lansing.

REQUIRED ECONOMICS FOR AGRICULTURE STUDENTS

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IN RECENT years there has been a great deal of discussion at key educational meetings, particularly those of land-grant colleges, about the need for more attention in agricultural education to economic and other social factors and relationships. Thus the 1948 *Joint Committee Report on Extension Programs, Policies, and Goals* stated: "Extension has a growing obligation to help rural people understand the complex social and economic problems . . . which confront them."¹

To what extent, however, has such a shift in attention actually been realized in the teaching of agriculture in the United States? A survey seeking to answer this question is now under way.

The purpose of this article, as a part of the inquiry, is to offer for consideration an outline of the main areas of economic analysis and information important to the average college graduate of today. It is hoped that this outline will serve as a starting point, and that comments, suggestions, and criticisms of its contents will be forthcoming from agricultural educators all over the nation. It also is hoped that other educators will undertake similar tasks relating to the place of sociology and political science in the required curricula of agricultural students.

It should be pointed out, however, that the following discussion does not apply to students of home economics or forestry.

It would be hard indeed to find a professional economist who does not believe that in the world of today with its mesh, or "mess", of economic relationships that every college graduate should have at least an elementary course in economics. There are two principle types of dissents from this position.

One is that anyone with the power of understanding that goes with a college education will be able to handle most of the economic problems likely to arise without taking a course in economics. They approve of departments of economics, but only to train economic specialists, or other specialists who may need additional background in economics.

The other dissenters are the specialists in fields other than economics. Physicians can be taken to illustrate this group. Their only responsibility, we may say, is to heal the sick or to keep people from getting sick. Most physicians have no decisions to make on their jobs that call for economic analysis, and therefore admittedly would not need special training in economics.

¹"Joint Committee Report on Extension Programs, Policies, and Goals," U. S. Department of Agriculture, Washington, D.C., p. 6.

It is true, however, that virtually all colleges of agriculture today require some kind of a course in economics. Principal exceptions include two schools which require eight or nine semester credits of social science including economics; three which do not require economics in highly special curricula; and one agricultural college which requires no economics at all, although 80 per cent of its students take the beginning course in agricultural economics.

The reason for this general inclusion of economics in agricultural curricula is no doubt that most agricultural graduates secure jobs which present economic problems that cannot be delegated to economic specialists. This is true of farm operation, extension work, most teaching, and positions with public agencies and business associated with agriculture. Agricultural graduates also often serve in important positions with co-operatives, public utilities, and county or district units of public agencies.

There still remains the question as to what kind of a course in economics is required and what it contains. The range is very wide, from three credits of either general or agricultural economics in a group of colleges, to three credits in general economics plus nine in agricultural economics in one college, and six semester credits, or eight quarter credits of general economics, in several others.

The rest of this paper will consider the content of the course or courses in economics that the writer thinks should be required of virtually all agricultural students. Possibly an exception should be made for those students who expect to be essentially technicians in special fields of the natural sciences. The proposed content is presented in a series of blocks, which are by no means of equal size or importance.

Orientation

This block would give the students an understanding of the position and role of agriculture in the world economy. They should know that the percentage of workers employed in agriculture varies from five per cent in the United Kingdom and 18 per cent in the U. S. to 70 per cent in Turkey, and even more in countries of Asia and Latin America, and the reasons for these differences. Along with this, students should understand the processes of population growth, industrialization, urbanization, and economic development as they take place in different parts of the world, based on widely varying natural resources and other conditions.

Educated farm folks also should know something about how the agriculture of other parts of their country, and the world, is organized, including such matters as ownership, tenure, and agricultural cooperation. If for no other reason, this knowledge would prevent these graduates from being narrow-minded about possible changes in organization at home.

At the end of his course in economics, the student of agriculture should

be able, first of all, to view agriculture in its proper perspective as a part of the world economy. He should realize, for example, that agriculture, constituting less than one-fifth of the American economy, is actually more dependent on the other segments than vice versa, in spite of the oft-quoted statement that "agriculture is the basic industry."

Orientation to these ends can be included in a general course in economics, but the subject matter in such a course is not likely to be specific enough for it. Two outstanding colleges of agriculture are now beginning their economics teaching with a required orientation course, one of these called "trends" in agriculture and the other the "geography" of agriculture.

Production Economics

The economics of production is the largest single block which should be included as a requirement for agricultural students. Although agriculture is by no means limited to production, most of what is now taught in colleges of agriculture is the technology of production and the natural sciences basic to it.

Nothing is more lacking in agricultural education today than the solid core of production economics to go with this technology and an integration of this into production organizations and programs. It should be integrated first, for individual farms; second, for area units like type-of-farming areas; third, for regions like the Corn Belt or the northern Great Plains; fourth, for the nation; and fifth, for the world.

A good or fair job of integrating production economics into production programs for the individual farms is being done by some colleges in their farm management courses. There is almost nothing being done, however, from the point of view of the community, nation, and the world.

A major alternative to leaving production economics to courses in farm management is to include its major principles in a beginning required course in economics. Once the student has become acquainted with these principles of production economics in his beginning years, he will himself combine them with the technology he is getting in courses in agronomy and husbandry. Or, he will want a course in farm management where this is done for him thoroughly and systematically.

Let us now define this body of production economics principles. It includes the principles relating to:

1. Combination of lines of production in one operating unit, as they work out in agriculture, trade, manufacturing, and other fields.
2. Location of production—what to produce on particular farms, areas, or regions and in combinations with other lines of production, in agriculture and out.
3. Combinations of lines of production in one community or area.
4. Major types of input-output combinations, and capacity and efficiency.

5. Time dimension, or the use of productive resources over time. These bring in conservation, appreciation and depreciation, and the like.
6. Organization, structure, and size of the operating unit, including external factors such as population density.
7. The cooperative mode of economic functioning in production.
8. Finally, an understanding of what is production, and the realization that effort must be directed to producing what is wanted or it may produce very little in the economic sense, and that effort can be so directed that it is a form of "economic robbery."

All of these principles, it may need to be affirmed, should be understood in terms of their meaning for social aggregates like nations and the world as well as for the individual farm or factory; also in terms of communities like cities, and on some occasions in terms of political units like states and counties. Logically and pedagogically, however, it is best to understand them first in terms of the individual firm or farm, and to bring in the inter-unit relationship elements later.

Beginning courses in general economics nowadays do usually teach something that is called "the theory of the firm." But the courses usually include only one-third of the production economics needed by agricultural students and it is taught in abstract form, with little attention to the principles outlined above. The most effective device for bringing these principles down to earth is to relate them to typical business operating statements of receipts and expenses.

Consumption Economics

This, of course, is the largest block in beginning economics for home economics students. And it should be a highly important segment of training for agriculture students, first, because consumption economics provides a basic understanding of demand for farm products, and second, because husbands and wives should understand each other's role in the family partnership and the economic problem of families.

Demand must be analyzed as a problem of consumption because, before changes in demand can be accounted for, one must be able to understand the household economics of consuming units and the factors of income elasticity. The analysis of the household as a consuming unit follows the same general lines as that of the economics of the farm or firm as a production unit. The objective is to find how to get the most out of the family budget, taking into consideration the different income levels, housekeeping labor inputs, and the importance of the time element in the choice between present goods and services and future needs for income.

Analysis of farm family consumption involves all these choices and, in addition, those between expenditure on production goods, like tractors,

farm buildings and land improvements, and those on family living. Such choices become especially critical if expenditures on family education and health are involved, or working on the farm versus school attendance.

As with production, the best place to begin consumption economic analysis is with the individual consuming unit. But it must be recognized that a large portion of the public expenditures of local townships, villages, cities, and counties are for public services that represent consumption. This is only less true of state and federal expenditures—setting aside the question as to whether military expenditures are production or consumption!

Finally, optimum production and optimum consumption cannot be determined independently of each other. The total economic return to society is larger if the consumption of a population makes use of that which has comparative advantage in production, and production adjusts itself to that which will give the largest final consumption output.

How well does the consumption economics in the usual beginning course in principles of economics serve the needs of students of agriculture? Not much better than it does their needs for production economics. The principal reason is that it fails to get down to analyzing the economics of actual consumption by households. Above all else, it would seem that a general course in economics should be a course in the *economics of living*. After all, people spend their lives mostly as firms, or families, or as single individuals, producing or consuming goods and services. If economic science is to serve humanity, as, for example, we expect of chemistry and medical science, economics must become more a science of private living as producers and consumers, and less narrowly a science of national aggregates and affairs of state. This statement is not intended to belittle national economics; rather it is intended to raise private economics up to a level alongside it.

Marketing and Price Economics

Marketing is another part of economic life that needs more attention. Fully a half of the price of consumer goods goes into getting them out of the hands of the farm, factory, or shop workers and into the hands of the consumers. Although this expense includes transportation and storage, it includes no processing except minor tasks incidental to marketing.

First of all, agricultural students should know why this process costs so much. Primarily, this involves an understanding of how competition in the marketing process enables so many people to make a living from it and also how the growth of trade contributes so much to the urbanization process. The desired result of understanding these factors will be the realization that merely reducing the pure profits of the middleman will change only slightly the prices received by farmers, or paid by consumers.

The beginning student also needs to understand the price-making process, first under conditions of pure competition and pure monopoly, and then under conditions of imperfect competition, oligopoly, and monopolistic competition generally, with some special reference to the markets in which farm people sell and buy. Later, the student must analyze marketing business units as firms, following the same general lines as for producing firms, except for the major difference in the shapes and slopes of the sales curves. He is then ready for the approach to marketing in terms of competing systems, integrated versus non-integrated, chain systems versus independents, cooperatives versus private, and many smaller variants in marketing channels.

Finally, further attention should be given to price economics under the heads of the response of production to price and supply curves, production-price cycles in agriculture, and public price-making of various forms.

Money and Banking

The agricultural student must be highly sensitive to price changes and keenly aware of their effects on the economy and their meaning in terms of investments, production planning, buying and selling, and the like. This requires a recognition of the difference between secular trends and short-run movements and of the behavior of prices in and out of wars and business cycles.

Many of the present survey economics courses devote more time to this area than is needed by the agricultural student.

Income and Its Distribution

Many of the beginning courses in general economics now offered start out with national income and its measurement and relate most of what follows to the effects on national income. This represents the aggregative approach to economics at its zenith.

The body of economics outlined in this paper begins at the other end, with effects on the income of the producing unit and on the content of living of the consuming unit, and builds up to national aggregates. It is felt that this course structure will give the student a much clearer conception of the national income, its major components, and how it is affected by various factors.

It is highly important that students of agriculture be able to think in terms of national aggregate incomes when analyzing problems in national policy. Situations arise frequently in which an increase in the incomes of particular groups in agriculture may decrease the national income by a larger amount, or at least decrease the real buying power of the national income. This is likely to be true, for example, whenever there is a short crop of cotton or potatoes. The first need of the student with respect to income aggregates is, of course, to be able to think of

them in terms of real or purchasing-power income as well as of money income.

As to the distribution of income, almost any informed person should have a rough idea as to how it is shared between the rich and the poor in his country, and among social classes and among wages and salaries, rents, and dividends and interest. Included should be an understanding of the process of determining wage rates, rents, and interest rates; the relation between income from land and land values; and how the real earnings in agriculture compare with those in urban occupations.

International Economics

All beginning students of economics should understand the bases of trade, as developed in the section on "Production Economics," and learn the differences between the conduct of internal trade within a nation and international trade, and the related concept of balance of payments.

They should understand the effects on international trade of such restrictions as exchange controls, customs duties, and import quotas. They need to be even better informed as to the effects of international capital movements and emigration and immigration. Also important is the knowledge of the general purposes and working of the international agencies such as the International Monetary Fund, International Bank, GATT, ECA, and FAO, and the effects of all these on the field of agriculture.

Other Significant Areas

There are other important areas of knowledge which should be included in the required beginning course in economics for agricultural students. These areas, with the main points which should be covered, are as follows:

Land Use—General facts as to distribution of land use in the United States and reasons for variations, and similarly, but in much more general terms, for the rest of the world.

Land Tenure—The meaning of the term broadly defined to include the different kinds of rights to the use of land in the U. S. and elsewhere; major types of farm leases in use in the United States and the input-output relations under each in the short and long runs; and social mobility under different tenure conditions.

Agricultural Credit—The role and uses of credit in agriculture, the different credit instruments, and the present sources of agricultural credit in the United States and their adequacy.

Agricultural Insurance—The insurance principle and its various applications in agriculture.

Public Finance—The different forms of taxation and sources of public revenue and the principles relating to the incidence of these; role and effects of public borrowing and debts; alternatives in fiscal policy in

general; and taxation, borrowing, and fiscal policy as it especially affects agriculture.

Agricultural Policy and Programs—The principal facts, how and why they were developed, and some analysis of these policies and programs in terms of the various areas covered in this outline.

Conclusions

These are the major subject matter areas which should be covered in any beginning required course in general economics for agricultural students. The next logical question is the academic pattern which this course should take.

There are several alternatives, but three seem to stand out as most plausible. Listed below, with credits being in terms of semesters, are these recommended course structures:

1. A three-credit required course in general principles, followed by at least a three-credit required course in agricultural economics.
2. A six-credit required course in general principles, followed by at least a three-credit required course in agricultural economics.
3. A six-credit required course in which general economics and agricultural economics are interwoven as outlined in this article.

This list does not include the alternative of a general course in economics with no required course in the economics of agriculture except for majors in agricultural economics, since this obviously fails to meet the needs for all agricultural students.

Both Plans 1 and 2 seem to have obvious drawbacks. The Number 1 arrangement probably does not give the agricultural student enough of the right kind of general economics, for example, in the area of production economics. Alternate Number 2 would probably take more time than is available for economics in most agricultural curricula. It would also tend to include general economics material that is properly included in an *elective* course in principles for liberal arts students, but not in a *required* course for agricultural students.

The analysis so far seems to point toward Number 3, the six-credit course combining general and agricultural economics. Not only would such a required course lend itself easily to the incorporation of all blocks discussed in this paper and in the proper strength to be most beneficial to students of agriculture, but it would also give students that important over-all perspective of how the agricultural economy fits into the broad general economy of the United States and the world. Such a course would give the agricultural student a strong foundation of economic knowledge on which to build a better and more meaningful education in any field of agriculture. But the evidence is by no means all in. The principal purpose of this article is to bring forth evidence to support other possible conclusions.

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ECONOMIC ASPECTS OF FEEDING FOR MILK PRODUCTION*

JOHN C. REDMAN†
University of Kentucky

ECONOMIC theory provides very useful tools with which the dairy farmer, as well as any other entrepreneur, may solve the many problems confronting him today. A major problem facing the dairyman is the determination of the economic rates of feeding grain and roughage.¹

Objectives of Study

This study² deals primarily with this problem:

(1) By establishing the characteristics and implications of the milk production function implied in the dairy feeding standards and recommendations;

(2) By studying the inconsistencies between the production function implied in feeding recommendations and (a) the economist's general concept of production functions, and (b) the generally available experimental data and information;

(3) By synthesizing some empirical milk production data consistent with (a) the economist's general concept of production function and (b) the generally available experimental data and information;

(4) By illustrating the use of the resultant production function in practical feeding problems;

(5) By pointing out other uses for the general approach presented.

The Production Function

The dairy farmer, in addition to his current operations, also must have a long-range program which will affect the quantity of milk produced. In doing this, he must take into consideration a large number of factors. Included are the number and breed of cows, level of inherent productivity, age, number of milkings per day, labor, climate, quantity and quality of feed and its composition, as indicated in the following general production function:

* The investigation reported in this paper is, in part, in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the director.

† Acknowledgement is due to my colleague, Glenn Johnson, for his helpful criticism.

¹ For a more complete and comprehensive study of this problem see John C. Redman, "Economic Considerations of Grain-Roughage Substitution in Feeding for Milk Production," Unpublished Ph.D. Dissertation, University of Kentucky, 1951.

² This work was done independently and perhaps simultaneously with the work of Earl Heady, "A Production Function and Marginal Rates of Substitution in the Utilization of Feed Resources by Dairy Cows," *This Journal*, November, 1951.

$$\text{Milk} = f \left(\begin{array}{l} \text{number of cows, breed, productivity, age, housing, labor,} \\ \text{climate, milkings per day, quantity and quality of feed.} \end{array} \right)$$

The possible influence of each of these variables on milk production depends on the length of time allowed to permit its full impact.

In relatively short-run planning periods, the farmer does not expect to alter the size of his herd, type of barn, or the quality of cow in adjusting to short-run price changes. Feed is the major input that can be varied in the short-run. Thus, in this instance, the farmer is restricted to the following sub-portion of the general function.

$$\text{Milk} = f \left(\begin{array}{l} \text{concentrates,} \\ \text{roughage} \end{array} \left| \begin{array}{l} \text{number of cows, breed, productivity, age,} \\ \text{labor, housing, climate, milkings per day.} \end{array} \right. \right)$$

The vertical bar in this functional relationship separates the fixed inputs and conditions from those the farmer may vary in the short-run. Thus, one of the easiest ways to take advantage of changes in the various price ratios of feed and milk is to alter the roughage-concentrates combination and the quantity of feed.

Sources of primary information available to the farmer are (1) the usual feeding standards and the many publications based upon them, (2) information reported by Jensen, *et. al.*³ and associated reports. The feeding standards through their usual use by technologists and some economists, ignore both the law of diminishing returns and changing marginal rates of substitution. The work by Jensen, *et. al.*, all but fails to consider the rates of substitution among feeds, particularly between roughage and concentrates, but has the advantage of considering the concept of diminishing returns. The question now arises as to what the usual feeding standards and their methods of use imply concerning the characteristics of the input-output function.

Constant Returns

As we have noted, milk production is a function of concentrates and roughage when other variables are constant and the effects of additional uncontrolled variables assumed stable enough to average out statistically. In general, the standards imply that milk production is a linear function of concentrates and roughage up to a limit, beyond which no additional milk is produced.⁴ Many tables appear which state that for each pound

³ Einar Jensen, *et al.*, *Input-Output Relationships in Milk Production*, U.S. Department of Agriculture Technical Bulletin 815, Government Printing Office, Washington, D.C., 1942.

⁴ Several state Agricultural Experiment Stations illustrate this by means of graphs which separate maintenance, production, and body fat. These show that any feed eaten after a given quantity results in production of fat. For specific illustration see I. R. Jones and R. W. Morse, *Feeding for Milk Production*, Station Bulletin 464, Corvallis, Oregon Agricultural Experiment Station, Corvallis, 1949, p. 13.

of four per cent fat-corrected milk (FCM)⁵ add .045 pound of digestible protein and .32 pound of total digestible nutrients (TDN) to the maintenance requirement of .60 pound of protein and 8.1 pounds of TDN.⁶ The implied total physical product (TPP) curve is a straight line with a horizontal marginal physical product (MPP) until the TPP becomes discontinuous and the marginal physical product becomes zero (Fig. 1). This means that the cow produces just as much for an additional pound of grain when fed near capacity as when fed at any other level.

The most definite indication that a constant relationship is assumed is that no provisions are made for adjusting feeding input, and hence milk output, to changes in milk-feed price relationships.

Substitutability of Feeds

Maintenance and production of milk are two of the most important short-run uses to which a dairy cow puts her feed. These uses merge and are almost indistinguishable. Obviously, a cow has to be maintained before she can produce milk and nature gives a priority to feed for maintenance over milk production. Suggested maintenance standards vary from 5.7 to 8 pounds of TDN per 1,000 pounds of liveweight. Work by Beach⁷ indicates when only grain is used to fill the maintenance requirement, about one-half of Morrison's standard is required, though cows so maintained are not as active as others. This suggests a deep curvature in the maintenance (zero iso-product) contour which means that less TDN is required for maintenance when feed is composed of both grain and hay instead of all hay or all grain. The fact that some physically optimum proportion may exist with respect to sources of TDN probably accounts for the wide variation found in the maintenance standards.

As further evidenced in various publications,⁸ most feeding recommendations assume or imply perfect substitutability between grain and roughage. Because of this assumption, and the assumption that roughage is cheaper, the usual recommendation is to feed all the roughage a cow can eat. The implication of an incremental increase in TDN along the stomach

⁵ Four per cent fat-corrected milk was used in a large portion of the work upon which this study is based.

⁶ Jones and Morse, *op. cit.*, p. 53.

⁷ C. L. Beach, "The Facility of Digestion of Feeds a Factor in Feeding," Bulletin 43, Connecticut Agricultural Experiment Station, Storrs, 1906.

⁸ See work by G. Q. Bateman, "The Relation of Grain Feeding to Milk and Butter-fat Production," Mimeograph Series 368, Utah Agricultural Experiment Station, Logan, 1950, Table 6, and by H. J. L'Hote, "Measuring Productive Value of Pasture," Bulletin 443, Missouri Agricultural Experiment Station, Columbia, 1947, p. 19, Table 3. In the Utah publication, the table shows when alfalfa hay is worth \$30 per ton, barley is worth \$2.32 per 100 pounds, wheat \$2.38, oats \$2.09, wheat bran \$2.00, corn \$2.39, etc. These values are based on the TDN content of each feed which are assumed to be perfect substitutes.

limit for roughages, which can be done by reducing roughage and adding grain, giving a constant increase in milk production, suggests that the product contour lines using concentrates and roughages as variables are assumed to be straight lines. In addition, the fact that no provisions are made for adjusting the grain-roughage combination for a given level of production according to changes in relative prices implies that near perfect substitutability is assumed between the two feeds.

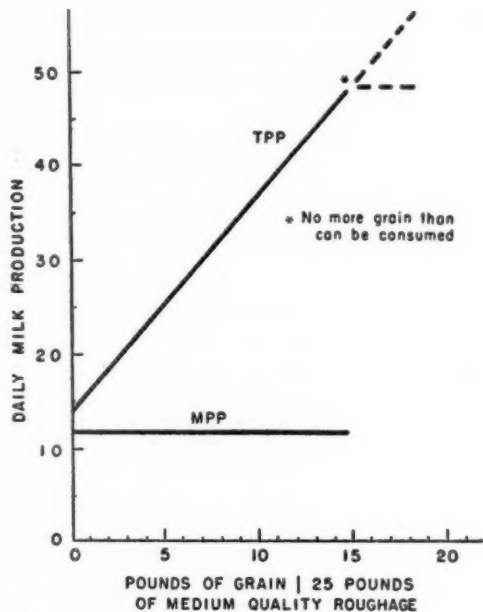


FIG. 1. Relationship between feed fed and milk production according to feeding recommendations.

The general recognition of a need for a "balanced ration," which means an optimum combination of all nutrients from roughages and grain, indicates that roughages and grain are not perfect substitutes. This, and the inconsistencies between the foregoing implications and certain experimental data and economic concepts of agricultural production certainly indicate that roughage and grain are not perfect substitutes for each other, but possess a degree of complementarity.

When roughages are assumed to be a perfect substitute for grain, the milk product contour lines are also assumed to be straight lines and with the constant returns from TDN, the total physical product will be rising constantly regardless of the location of the scale line. The scale line indicates the least cost combination of the two inputs, hay and concentrates,

necessary to produce different quantities of milk. If the ratio of the marginal product of concentrates to that of roughage is less than the ratio of their respective prices,

$$\frac{MPP_c}{MPP_r} < \frac{P_c}{P_r}$$

and concentrates and roughage are assumed perfect substitutes, the scale line is so located to indicate that a cow will utilize all roughage until the stomach capacity for roughage is reached, beyond which the scale line will coincide with the stomach capacity for feed. If the usual feeding assumptions were accepted, it would be profitable to go to the limit of feed consumption since an additional pound of TDN would yield as much near the limit of consumption as at any other level of feeding.

If, for some reason, such as an extremely short hay crop, concentrates should become cheaper relative to roughages, the scale line as implied by the feeding recommendations would be so located that all concentrates would be fed. However, due to the fact that ruminants require some roughage to keep healthy and active, it has never appeared practical to feed all grain even if concentrates are cheaper than hay. This indicates to the economist that the product contours are curved and not straight lines as implied in the feeding standards. Thus, the concepts of diminishing returns and partial substitutability or complementarity of inputs appear to be applicable to the problem of dairy feeding. Yet such concepts do not appear generally in the recommendations of the dairy specialists as evidenced by various publications.

Research Information Available

Available research findings indicate a degree of complementarity between grain and roughage. When viewed collectively by an economist, these research findings raise many questions concerning the production function implied by the feeding recommendations.

Work by Beach⁹ indicates that as more grain is fed to a cow, the maintenance requirements (zero isoproduct curve) become less and less, i.e., the TDN become more efficient. As the ration approaches an all-grain ration, a point is eventually reached beyond which the TDN contained in concentrates become less and less efficient in maintaining good health and activities of the cow. To the economist, this information and line of reasoning indicate that a degree of complementarity is present.

Several statistical studies have been made on input-output relationships in milk production. A recent study¹⁰ used records on 261 dairy farms

⁹ Beach, *op cit.*

¹⁰ A. J. Ashe, "Response of Milk Production to Increased Grain Feeding," *Farm Economics*, Number 174, Cornell University, Ithaca, N.Y., March, 1950.

from 1940-47 to determine the relationship between annual grain consumption and milk production per cow. The study concluded that an almost linear relationship between grain intake and milk output was observed up to about 4,000 pounds of grain intake per cow; from 4,000 to 6,000 pounds only a slight increase in milk resulted; and above 6,000 pounds no increase in milk resulted. A critical appraisal of this piece of work indicates that a large number of cows, involving many uncontrolled variables, were fed grain according to the standard. It must be remembered there were over 6,000 separate production functions considered. One point on each production surface, as determined by the standards, was selected and this when plotted gave a wide scatter diagram to which a curve was fitted. Comparing selected points on the unlike functions often gives fallacious "proof" that a straight line relationship exists.¹¹

Forbes, *et. al.*,¹² found that net energy value of corn fed to cattle was much greater when fed with alfalfa hay than when fed alone. This backs up the idea previously advanced that beyond a point, the feeding value of corn for a given level of production became less and less. This means that corn has become redundant and more is required relative to roughage to maintain a given production. Thus, it seems that net energy value of a feed stuff varies with the proportion of the ration which it constitutes. Forbes previously had advanced the theory that the determination of consistent net energy values would require the presence of all nutrients in optimum quantities and proportions.¹³

Cox,¹⁴ in working with lambs, found that when using concentrate-roughage ratios of 35:65, 45:55, 55:45, the highest gain in weight per 100 pounds of TDN fed was obtained with the 45:55 concentrate-roughage ratio, which indicates that the highest degree of technical efficiency in the use of TDN resulted with the use of about a 50-50 concentrate-roughage ratio. This further demonstrates that a degree of complementarity exists between the two feeds.

Huffman and Duncan¹⁵ fed a group of cows on an all-alfalfa hay ration

¹¹ For a further discussion of this problem see M. Bronfenbrenner, "Production Functions: Cobb-Douglas, Interfirm, Intrafirm," *Econometrica*, Vol. 12, January, 1944, pp. 35-44, and M. W. Reder, "An Alternative Interpretation of the Cobb-Douglas Function," *Econometrica*, Vol. 12, July-October, 1943, pp. 259-264.

¹² E. B. Forbes, *et al.*, "The Metabolizable Energy and Net Energy Values of Corn Meal When Fed Exclusively and in Combination with Alfalfa Hay," *Journal of Agricultural Research*, Vol. 43, No. 11, 1931.

¹³ E. B. Forbes, "The Problem of Determination of Net Energy Values of Feeding Stuffs," *American Journal of Physiology*, Vol. 92, 1929.

¹⁴ R. F. Cox, "Physical Balance as a Factor in Determining the Efficiency of Feed Utilization by Fattening Lambs," Technical Bulletin 65, Kansas Agricultural Experiment Station, Manhattan, 1948.

¹⁵ C. F. Huffman and C. W. Duncan, "The Nutritive Value of Alfalfa Hay. III. Corn as a Supplement to All-Alfalfa Hay Ration for Milk Production," *Journal of Dairy Science*, XXXII, No. 5, May, 1949, pp. 465-474.

to eliminate the possible residual effects of feeds previously fed and then a part of the digestible nutrients in alfalfa was replaced with corn. About 15 pounds of alfalfa hay were replaced with nine pounds of corn on an equal total digestible nutrient basis and at the same time the increase in milk per day varied from 7.6 to 37.1 per cent. Milk production started increasing significantly the second day following the addition of corn to the ration and a plateau was reached in seven to 10 days. A change back to an all-alfalfa hay ration resulted in a sharp drop the second day. It was a week or longer before stabilization occurred. The wide variation in milk increase was attributed to variation in lactation, gestation, and inheritance. This work further substantiates the idea of a degree of complementarity between grain and hay and approaches the economist's concept of the production function with changing rates of marginal substitution. This means that if one of these inputs is being substituted for the other, an increasing quantity of the one being increased will be required to replace a unit of the one being decreased to produce a given quantity of milk.

In the study reported by Jensen, *et. al.*,¹⁶ it was shown that the concept of diminishing returns is valid in feeding for milk production. Also, it is pointed out in this paper that roughage and concentrates are not perfect substitutes. However, despite this evidence, the straight line concepts of the relationships between inputs and outputs are firmly entrenched in the minds of many people. Many dairy farmers consequently find themselves in somewhat of a dilemma when it comes to determining the optimum combination of grain and roughage as well as the optimum quantity of feed to give their cows.

The dilemma results apparently when the total of TDN consumed is divided by the quantity of milk produced at that intake of feed to obtain the average quantity of TDN per pound of milk. This establishes an average relationship for that particular input and output which will not be true for any other input-output relationship. The principle of diminishing returns is neglected when one point on the total output curve is selected. Only at the point of intersection of the straight line—the relationship implied by the use of the dairy feeding recommendations—and the curved line—the relationship between feed inputs and milk output according to the concept of diminishing returns—will both concepts be in agreement. If the average requirement obtained at one output of milk is projected to other points on the straight line, a divergence of milk production will result between these points and those on the curved line for varying quantities of feed inputs.

The work by Jensen, *et. al.*,¹⁷ contains valuable knowledge on the eco-

¹⁶ Jensen, *et. al.*, *op. cit.*

¹⁷ *Ibid.*

nomics of feeding. But it does not describe fully the nature of the function found in milk production, particularly the nature of roughage-grain substitution relationship. The study indicates that the grain-roughage combination used was principally along the stomach capacity line for feed, along which the scale line is tacitly assumed to follow. A cross section of this production function along the stomach capacity line approximates a total physical product curve that shows diminishing marginal physical product beyond the maintenance requirement. The study fails to provide much information on the marginal rates of substitution of hay and grain. Some information, however, is given on grain-roughage substitution along the stomach capacity line.

In order for the farmer to feed his cows intelligently according to the changing price relationships, it is essential to know the shape and location of the product contours. It would be fruitful research if dairy technologists would establish the necessary data for this purpose. However, in absence of this essential information, this study attempts to synthesize a production function which will (1) provide some basis for adjustments in feeding dairy cows and (2) illustrate the usefulness of the concepts presented.

The acceptable portions of feeding recommendations, certain experimental data available in fragmentary form, and the basic concepts of the economist provide the basis for estimating the empirical data. It is to be pointed out that synthesized production functions will not be highly accurate from an empirical standpoint. Conceptual accuracy rather than empirical accuracy is sought for this case, though both are ultimately essential.

Synthesized Production Function and Its Use

The production function to be established for illustration is for a 1,200-pound cow capable of giving 9,000 pounds of four per cent fat-corrected milk when fed at the grain-milk ratio of 1:4 and all the medium quality hay she would consume. When the qualities of the cow, hay, and concentrates are fixed, it is possible to estimate the various combinations of quantities of grain and hay which will produce a given output of milk. This will provide a product contour representing various combinations of hay and grain necessary to establish the product contours. The curvature of these contours will indicate the marginal rate of substitution between grain and hay, i.e., the amount of the input being increased required to replace a unit of the other input if output of milk is to remain unchanged.

Data from various feeding experiments, together with a framework of logical reasoning, gave us an estimate of the curvature and the value of the product contours from 6,000 to 11,000 pounds of milk (Fig. 2). The

lower right corner of this figure is the area with which Huffman's work at Michigan State College¹⁸ was concerned. A small quantity of grain will replace a relatively large quantity of hay. The other end of this series of contours probably stops short of touching the concentrate axis. Available data do not permit the determination of how quickly the product contours turn upward or whether they touch the concentrate axis. There is some evidence that beyond a grain-milk ratio of about 1:1.5 or 1:1.75 the cow tends to go off feed, at which point the product contours become vertical.¹⁹

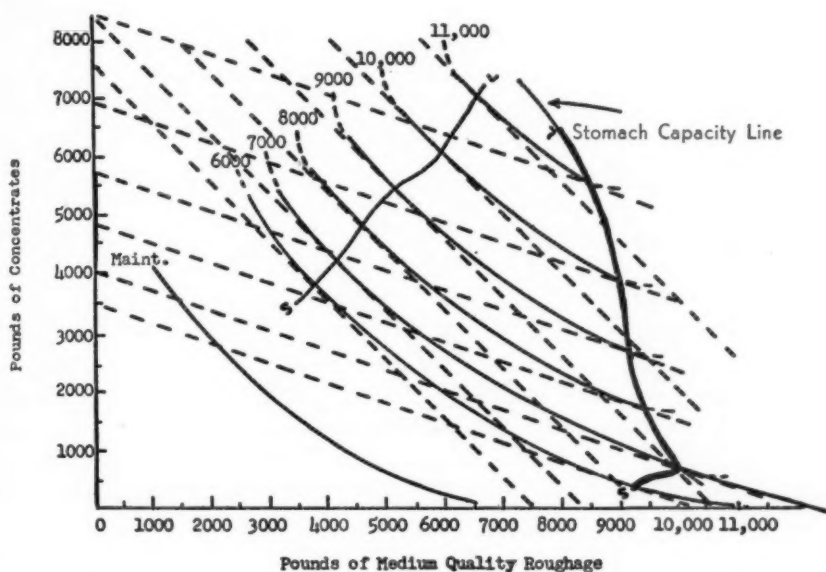


FIG. 2. Estimated Surface of Production Function for a 1,200-Pound Cow Capable of Giving 9,000 Pounds of Four Per Cent FCM When Fed 1:4 Grain-Milk Ratio.

When the prices of grain and hay are such that cost of grain per ton is the same as that of hay, and this is admittedly an extreme situation, the price line or constant outlay curve will indicate that for a given sum of money the farmer can buy 7,500 pounds of either hay or grain, or any combination of each. The points of tangency of the price (iso-cost) lines of feed with the milk product contours is the least cost combination for any particular output of milk. The line made up of such points is the path of expansion, or scale line, up which the dairyman moves to an optimum point as determined by the cost of both hay and grain and the price of milk.

The total physical product curve can be derived along the scale line

¹⁸ Huffman and Duncan, *op. cit.*

¹⁹ Original data from Jensen, *et. al.*, *op. cit.*

which is determined by the hay-concentrate price ratio of 1:1, and the marginal physical product can be determined for each 1,000 pounds of TDN²⁰ fed when the TDN are combined from hay and grain according to the scale line proportions (Fig. 3). If the price of milk should be two dollars per hundred (as was the case in the late thirties), and the price of

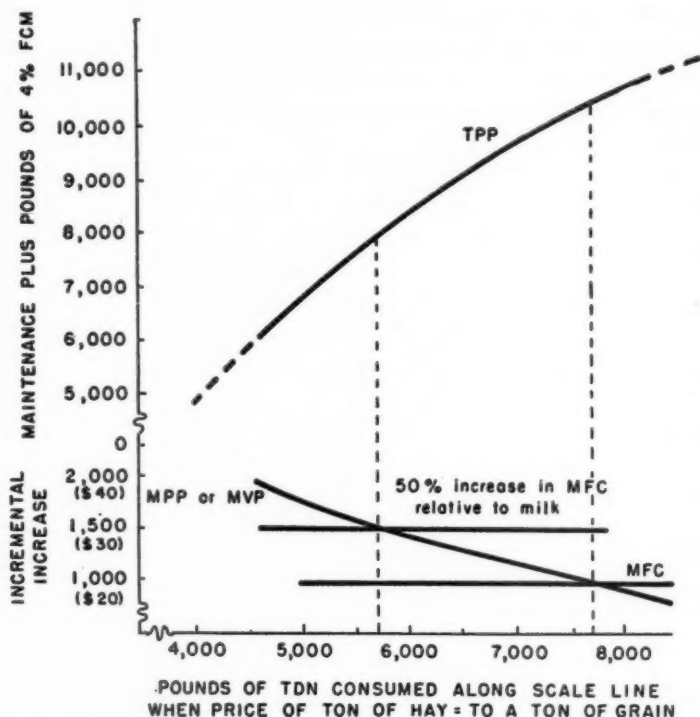


FIG. 3. Estimated Productivity Curves for a 1,200-Pound Cow Capable of Giving 9,000 Pounds of Four Per Cent FCM at 1:4 Grain-Milk Ratio.

hay and grain \$25.00 per ton the marginal factor cost (or cost of 1,000 pounds of TDN combined according to scale line proportion) would intersect the marginal value product with the use of 7,700 pounds of TDN. This quantity of TDN would be furnished by about 6,100 pounds of hay and 6,300 pounds of concentrates and would produce about 10,350 pounds of milk. This is the optimum point on the scale line with these price re-

²⁰ The use of the TDN concept here does not imply perfect substitutability between grain and hay. Some unit is needed, such as TDN or dollars worth of feed combined according to scale line proportions, to determine the optimum quantity of feed to use. Since the TDN concept is in common use, it will be used here.

relationships. If the price of feed (hay and grain combined according to scale line proportions) increased by 50 per cent relative to the price of milk, the optimum quantity of TDN to use would be 5,700 pounds derived from feeding about 4,700 pounds of grain and 4,500 pounds of hay which would produce about 7,850 pounds of milk. This means that the cow under these price ratios can profitably get around 38 per cent of the necessary TDN from roughage and the rest must come from grain.

The TDN required per pound of milk²¹ produced along this particular scale line varies considerably with the level of output. When this quality of cow is fed to produce 5,700 pounds of four per cent fat-corrected milk, she will use 1,150 pounds of TDN (allowing 3,300 pounds of TDN for maintenance) for production, or .20 pound of TDN per pound of milk. If the same cow should be fed to produce 11,000 pounds of milk, she will use 4,900 pounds of TDN above maintenance for production or .45 pound TDN per pound of milk. The usual feeding recommendation will be approximated when fed to produce 8,300 pounds of milk requiring 2,700 pounds of TDN or .325 pound of TDN per pound of milk. To increase the production from 8,300 pounds, which can be produced according to the standard, to 11,000 pounds would require an additional 2,200 pounds of TDN, or an average of 1.2 pounds of TDN per pound of additional milk.

If the dairyman should experience the more usual hay-concentrate price ratio of 1:3, he, if interested in profits, would make up his ration from a different combination of hay and grain than he would under the 1:1 ratio. He would substitute hay for grain to take advantage of the cheaper feed, but the marginal rate of substitution is not constant. The scale line would shift to the limit set by the stomach capacity for use of hay (Fig. 2). When the farmer combines his concentrates and hay according to this scale line and increases the quantity of feed fed, he experiences the same general degree of diminishing returns to TDN as reported by Jensen.

At either of these scale lines, a pound of total digestible nutrients will not produce as much as at some place in between as evidenced by a curvature of the product contours. Technical efficiency is not the only determining factor in the combination of the feeds. Economic efficiency, which is determined by both technical efficiency and relative prices of the inputs, determines the practical combination. A little sacrifice of technical efficiency can well be made to obtain the use of a cheaper input which will more than compensate for the loss of technical efficiency.

²¹ Probably a better way of stating this would be "pounds of milk produced per pound of TDN" to indicate that milk is a function of TDN, and not vice versa. However, since the production is expressed this way in most dairy studies, it will be used here also. It should be remembered that the quantity of TDN or feed required to produce a pound of milk depends also upon the combination of the feed used.

Other Uses

The dairy technologist would make a greater contribution to the development of the feeding standards and especially to their practical or economic use if greater use is made of the conceptual framework presented herein. It may be recalled that the early work of Thaer in 1810 was extremely simple when he compared all other feeding stuffs with meadow hay as a base. In 1859, Grouven proposed a standard based on the total protein, carbohydrates, and fat. In 1864, Wolff presented a table of standards based on total digestible nutrients which was modified by Lehman in 1897 by considering the quantity of milk. Professor Haecker of the University of Minnesota in 1914 made further improvement by making available a comprehensive set of requirements for maintenance and milk production which considered the quality of milk. The revised Haecker standards correspond closely with the Morrison standards which are widely used today.

It is to be noted that the standards developed from the very simple approximations by Thaer to the more complicated approximations by Morrison and Haecker accounted for more and more variables as improved knowledge of dairying developed. It was undoubtedly necessary in the earlier stages of development to make such simplifying assumptions as perfect substitutability of feeds and constant returns of milk per unit of feed input in order to derive more usable knowledge about feeding for milk production. However, the time has now arrived for relaxing these assumptions of linear relationships and for incorporating the concept of changing marginal rates of substitution implied by the law of diminishing returns.

The concept of diminishing returns which was studied along the stomach capacity line by Jensen and others²² in 1942 is slowly being incorporated into the feeding recommendations. It is hoped that this and other studies dealing with the concepts of diminishing returns and substitutability of grain and roughage off the stomach capacity line will provide further impetus to refinement of feeding standards in line with needs of farm managers and farm economists.

An improvement in the standards which serve as guides to so many dairy farmers can be of great value in formulating a basis for making adjustments due to change in various price relationships. Also, improved feeding standards would lead to more accurate establishment of the cost structure found in dairy farming. Cost curves for different quality cows on various feed combinations utilizing different lengths of run would be valuable to the farmer who constantly seeks the low, elastic marginal cost

²² Jensen, *et. al.*, *op. cit.*

curve to provide economic flexibility in meeting any adversities. Improved knowledge of the marginal rates of substitution between forage and grain would enable dairy farmers to decide whether or not to invest in producing more forage, or higher quality forage or higher quality cows.

Studies of this nature are useful in estimating the effects of such programs as the soil conservation program, the green pastures program, and the desire to conserve grain for national emergency, on farm organization and practices. Such programs mean more roughage and less grain in the farm feed supply. This may result in a reduction of milk production per cow in the short run if the feeding operations are already on the stomach capacity line. In long-run considerations, this possible reduction can be averted by improving the quality of forage and the level of productivity of the cows. The extent that substitution of hay for grain is possible depends upon previous methods of feeding.

It is hoped that future studies will be designed by the dairy technologists to provide more accurate data than presented herein. It is the writer's opinion that until more information of the nature involved in this paper is provided, the dairy farmer will be forced to make his decisions without the possible assistance of our agricultural research program.

RURAL INDUSTRIES AND AGRICULTURAL DEVELOPMENT

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A LARGE expansion in off-farm job opportunities for farm workers has been widely proposed as an important solution to the problem of low income in American agriculture.¹ However, not much consideration has been given to the kinds of off-farm jobs that can be created.

Popular opinion has long held that the so-called "rural industries" can be an important source of employment for workers shifting out of agriculture. For example, the recent report on *Underemployment in Agriculture*, prepared for the National Planning Association states, categorically and without documentation, that the many small businesses supplying services to farm areas and processing agricultural raw materials "can be made more important in actual number of workers and pay roll involved than big industry." (Emphasis supplied.)² A pamphlet recently published by the *Progressive Farmer* discusses rural industries in these equally optimistic terms:³

"WILL RURAL INDUSTRIES HELP SOLVE POSTWAR PROBLEMS?"

"Yes. They may be our biggest single opportunity for solving these problems.

"Think what a dozen new RURAL INDUSTRIES will do to help solve the postwar problems of your community or county! Think what thousands of such new industries will do for the rural South!"

* The author is indebted to Vernon Ruttan and Lewis Copeland of the Tennessee Valley Authority for helpful suggestions and criticisms in preparing this paper.

¹ See Arthur Moore, *Underemployment in Agriculture*, National Planning Association, Washington, D.C., 1952, Planning Pamphlet No. 77.

Underemployment of Rural Families, Material prepared for the Joint Committee on the Economic Report by the Committee Staff, February, 1951, U. S. Government Printing Office, Washington, D.C., 1951.

Study of Agriculture and Economic Problems of the Cotton Belt, Hearings before the Special Subcommittee on Cotton of the Committee on Agriculture, House of Representatives, July 7 and 8, 1947, U. S. Government Printing Office, Washington, D.C., 1947.

² Arthur Moore, *op. cit.*, pp. 41-42. This report does not use the "rural industries" label but identifies such "small businesses" as canning plants, dehydrating plants, poultry processors, small scale meat processors, cheese factories, milk processors, feed grinders, custom livestock slaughtering, etc., and refers to service as well as processing industries.

³ "New Rural Industries That Fit Your Community," *The Progressive Farmer*, Birmingham, Alabama, 1945, p. 5. Rural industries are defined "in a very broad sense" to include "all plants, equipment and services—connected with farming and rural life," p. 6.

Yet, despite such frequent enthusiasm for rural industries, the employment possibilities in this field have not been quantitatively appraised in terms of specific industries. Nor has the subject of rural industries been evaluated with due regard to business considerations customarily involved in locating industry. One writer suggests that the advocates of rural industries "apparently are influenced more by what *they feel* would be the wholesome sociological consequences of such development than by a careful appraisal of the probable effect upon costs of production." (Emphasis supplied.)⁴

This paper examines critically and quantitatively the matter of rural industries as a solution to the serious problem of underemployment in American agriculture—a problem which in the nation as a whole involves a potential shift of several million farm workers to off-farm jobs.⁵ Special attention is focused on the Southeast,⁶ where underemployment is most acute and where about a million farm workers could be released from agriculture.⁷

Location Economics and Rural Industries

A quantitative appraisal of employment opportunities must start with a precise and functional definition of rural industries. Such a definition, however, is not presently available in the literature on rural industries.

Rural industries have been vaguely defined as "industries with a more or less 'organic' relation to their rural surroundings, with regard to both labor and materials;"⁸ and as "any manufacturing plant that is so located that a considerable proportion of its workers may be expected to be rural people."⁹ Still another writer explains that "rural manufacturing is not

⁴ William N. Mitchell, *Trends in Industrial Location in the Chicago Region Since 1920*, University of Chicago Press, 1933, p. 68.

⁵ The recent study for the Joint Committee of the Economic Report (*op. cit.*) suggests that for the nation as a whole, improved productivity in agriculture could increase the output of rural people by between 20 and 25 per cent, and that "this is the equivalent of adding 2,500,000 workers to the total labor force," p. 5.

⁶ The Southeast is defined herein to include the following seven states: Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia. This geographical grouping was selected because of the availability of detailed data on manufacturing in these states.

⁷ The author's rough estimate of underemployment for the Southeast is intended only to identify the general magnitude of the problem for that area. It is consistent, for example, with the conclusion reached in the *Study of Agricultural and Economic Problems of the Cotton Belt*, *op. cit.* This states that for the 13 "Cotton States" of the South that "it is possible to increase the physical volume of production . . . by a little more than 50 per cent under efficient agriculture" with "a farm population approximately one-third smaller," p. 12.

⁸ Carl Brinkmann, "Rural Industries," *Encyclopedia of the Social Sciences*, 1934, Vol. 13, p. 468.

⁹ James M. Stepp, *Rural Industrial Development in Four Southern States, Since World War II*, National Planning Association, Committee of the South, June, 1948, p. 6.

TABLE I.* RURAL INDUSTRIES IN THE UNITED

Industry Groups	Number of Establishments				Number of Production Workers	
	Number 1947		Change in Number 1939-47		Number 1947	
	United States	South-east	United States	South-east	United States 1000	South-east 1000
ALL MANUFACTURING INDUSTRIES	240,881	24,627	67,079	8,898	11,916.2	1,324.2
ALL RURAL INDUSTRIES	38,214	10,631	11,560 ^{bo}	5,134 ^{ced}	1,221.4	277.3
<i>Agricultural Rural Industries</i>	13,783	1,421	-1,601 ^b	-126 ^d	544.8	88.7
Meat Packing Wholesale	2,153	224	761	94	167.1	10.4
Canning & Preserving (Ex. Fish)	2,265	218	366	40	121.9	6.6
Flour and Meal	1,243	372	-900	-214	30.7	3.6
Cigarettes	28	14	-7	-5	25.6	23.7
Tobacco Stemming & Redrying	163	128	n.a.	n.a.	23.5	22.1
Poultry Dressing Wholesale	557	46	-195	26	19.2	2.1
Pickles and Sauces	743	44	232	12	18.6	1.7
Frozen Foods	291	39	230	32	15.8	1.6
Creamery Butter	2,157	36	-1,349 ^{ce}	-70 ^e	15.2	.8
Concentrated Milk	562	28	— ^e	-3 ^e	14.0	1.3
Cottonseed Oil Mills	315	122	-132	-50	12.1	5.1
Beet Sugar	74	—	-11	—	11.6	—
Natural Cheese	1,811	48	-871 ^e	-12 ^e	10.5	.8
Corn Products	55	1	20	—	10.2	n.a.
Chewing & Smoking Tobacco	73	23	-59	-8	9.7	6.1
Liquid, Frozen & Dried Eggs	154	5	113	4	8.7	.1
Wines and Brandy	418	13	70	6	5.8	.2
Soybean Oil Mills	133	15	86	10	5.1	.6
Vegetable Oil Mills, N.E.C.	84	32	46	17	4.3	1.5
Raw Cane Sugar	82	—	4	—	4.0	—
Dehydrated Fruits & Vegetables	146	4	n.a.	1	3.7	.3 ^b
Rice Cleaning & Polishing	88	1	16	—	3.3	n.a.
Malt	53	—	1	—	2.1	—
Linseed Oil Mills	17	—	-8	—	1.3	—
Vinegar and Cider	118	8	-14	-6	.8	.1
<i>Forestry Rural Industries</i>	21,038	8,699	11,764 ^e	5,157 ^e	609.8	172.6
Sawmills & Planing Mills, Gen.	19,039	8,298	11,719	5,180	363.7	128.8
Paper and Board Mills	665	44	15	9	128.7	12.9
Pulp Mills	226	34	32	8	45.4	10.8
Plywood Mills	162	46	64	11	24.4	4.7
Paper Coating & Glazing	182	6	42	3	15.2	.4 ^b
Cooperage Stock Mills	250	122	-70	-52	11.7	6.1
Veneer Mills	156	75	17	10	9.7	4.6
Softwood Distillation	32	13	7	-2	4.1	2.6
Shingle Mills	184	—	-42	—	2.4	—
Hardwood Distillation	27	2	-16	-1	1.6	.4 ^b
Natural Tanning & Dyeing	28	10	-7	-5	1.2	.7
Excelsior Mills	56	25	3	-4	1.1	.3
Gum Naval Stores (Steam Distilled)	31	24	n.a.	n.a.	.5	.4 ^b
<i>Rural Market Industries</i>	3,393	511	1,397	103	66.8	16.0
Prepared Animal Feeds	2,689	249	1,306	155	40.3	6.0
Fertilizers	187	88	16	10	17.4	6.5
Fertilizers (Mixing Only)	517	174	75	-62	9.2	3.5

* See page 350 for explanation of symbols used in this table.

STATES AND SEVEN SOUTHEASTERN STATES*

Number of Production Workers						Average Annual Wage Per Worker, 1947	
Change, 1939-47		Per Cent Change, 1939-47		Per Cent of Total Manuf'g., 1947		United States	South-east
United States 1000	South-east 1000	United States	South-east	United States	South-east		
4,108.0	411.9	53	45	100.00	100.00	\$2,538	\$1,903
357.8 ^{bc}	90.2 ^{ed}	41 ^{be}	48 ^{ed}	10.25	20.94	2,252	1,593 ^{ed}
153.2 ^b	10.5 ^d	40 ^b	12 ^d	4.57	6.69	2,285	1,730 ^a
52.0	4.2	45	68	1.40	.78	2,806	2,150
28.3	1.6	30	32	1.02	.50	1,927	1,010
6.0	.1	24	4	.26	.27	2,789	1,873
-1.9	-2.0	-7	-8	.21	1.79	2,152	2,153
n.a.	n.a.	n.a.	n.a.	.20	1.67	1,460	1,466
5.2	1.8	37	519	.16	.16	1,525	1,189
6.1	.5	49	41	.15	.13	1,945	1,428
12.4	1.3	373	404	.18	.12	1,638	763
7.2 ^x	.05 ^x	40	7	.13	.06	2,092	1,906
9.9 ^x	.5 ^x	102	60	.12	.10	2,492	1,572
-3.1	-1.8	-20	-26	.10	.39	1,859	1,722
1.2	—	12	—	.10	—	2,575	—
7.7 ^x	.5 ^x	153	193	.09	.06	2,185	1,886
3.4	n.a.	50	n.a.	.09	n.a.	3,218	n.a.
.5	1.7	6	40	.08	.46	1,811	1,696
7.3	.1	527	404	.07	.01	1,527	1,230
3.5	.1	149	386	.05	.01	2,349	1,506
3.6	.4	242	171	.04	.04	2,657	2,099
3.4	1.2	399	351	.04	.11	2,300	1,493
-.2	—	-5	—	.03	—	1,640	—
n.a.	.3	n.a.	1,322	.03	.02	1,866	n.a.
.9	n.a.	39	n.a.	.03	n.a.	2,051	n.a.
.6	—	42	—	.02	—	3,393	—
-.8	—	-36	—	.01	—	2,689	—
-.2	-.06	-22	-33	.01	.01	1,907	1,467
172.0 ^a	73.7 ^a	39 ^a	75 ^a	5.11	13.03	2,229	1,513 ^f
115.4	57.6	46	81	3.07	9.73	1,880	1,281
13.5	4.1	12	46	1.08	.97	2,965	2,692
18.5	5.4	69	101	.38	.81	2,807	2,551
11.3	2.2 ^h	86	87	.20	.35	2,535	1,686
7.7	.3	104	438	.12	.03	2,843	n.a.
3.3	2.4	39	66	.10	.46	1,532	1,412
1.9	.5	25	14	.08	.35	1,774	1,635
1.7	1.0	73	68	.03	.19	2,372	2,372
-1.3	—	-35	—	.02	—	2,993	—
-.2	-.1	-9	-25	.01	.03	2,048	n.a.
-.09	.2 ^h	-7	36	.01	.05	2,059	2,023
.2	-.02	17	-6	.01	.03	2,137	1,458
n.a.	n.a.	n.a.	n.a.	x	.03	1,850	n.a.
32.6	6.0	95	60	.56	1.20	2,189	1,694
24.9	4.4	161	285	.34	.45	2,324	1,779
6.3	2.0	58	44	.15	.49	2,147	1,779
1.4	-.3	18	-8	.08	.26	1,679	1,388

limited to the processing of agricultural commodities—flour grinding, rice husking, or tobacco manufacturing. It also includes all kinds of simple manufacturing that does not require much capital. It is essentially of two types which differ in their economic function, full time activity for non-agriculturists of the village, and part time employment” of farmers.¹⁰

Rural industries have been described also in terms of specific listings of manufacturing activities. A recent pamphlet listed “One Hundred and One Rural Industries” and included such ‘interesting’ operations as stone quarries, candy factories, farm machinery plants, broom factories and glass factories.¹¹

Most discussions of rural industries, however, have emphasized the utilization of agricultural raw materials and the relationship of such industries to agricultural activities.¹² In line with this practice, the following definition will be employed in this paper: *rural industries are industries that have a major locational advantage when located proximate to agricultural raw materials, forestry raw materials, or local agricultural markets.*

This definition excludes industries located in rural areas for reasons other than the direct locational influence of the agricultural sector of our economy. It excludes, for example, the atomic energy operations at Oak

¹⁰ Henry G. Aubrey, “Small Industry in Economic Development,” *Social Research*, September, 1951, Vol. 18, No. III, p. 291.

¹¹ “New Rural Industries that Fit Your Community,” *The Progressive Farmer*, Birmingham, Alabama, 1945.

¹² Conceivably, different definitions of rural industries can be justified for different purposes. For example, if the major interest were in dispersion of industry for security purposes, we might prefer to consider as rural industries all types of operations which could operate successfully (and probably economically) outside of urban areas.

Footnotes to Table 1, pp. 348-349

^a Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia.

^b Does not include “dehydrated fruits and vegetables,” and “tobacco stemming and redrying” industries because of changes in Census coverage.

^c Does not include change in “gum naval stores (steam distilled)” industry because of changes in Census coverage.

^d This figure does not include “tobacco stemming and redrying,” which was not considered a manufacturing industry in 1939.

^e Does not include wages in “dehydrated fruits and vegetables,” “rice cleaning and polishing,” and “corn products” industries because of disclosure regulations of the Census.

^f Does not include wages in “paper coating and glazing,” “hardwood distillation,” and “gum naval stores” because of disclosure regulations of the Census.

^g Figures for 1939 include dairy plants distributing fluid milk. Such combination plants are not covered in the 1947 Census.

^h Estimate based on size of firm data. Actual employment not reported due to disclosure regulations of the Census.

ⁱ n.a. Not available because of disclosure regulations or changes in coverage of Census.

^j Less than .01 of one percent.

Sources: *Census of Manufactures*, 1939 and 1947, and special unpublished tabulations for seven southeastern states, by Bureau of the Census.

Ridge, which, though initially located in a rural area, were located with primary concern for available electric power and geographical isolation. It excludes such labor-oriented industries as textiles, apparel, and shoes which are not *uniquely* attracted to agricultural areas even though they may employ farm workers. It excludes also mining and mineral processing operations oriented to mineral resources in rural areas.

With rural industries defined in terms of locational characteristics, it is possible to identify specific rural industries and analyze their employment potentials. Implicit in the identification step is an understanding of both the locational characteristics of particular industries and the process of locating industry in a private enterprise economy.

The factors which influence plant locations vary from one type of industrial operation to another and include a complex of technological, engineering, and economic considerations. Most industries, however, fall into one of three broad categories: (1) market oriented, (2) labor oriented, or (3) material oriented.¹³ All of these major factors—markets, materials, and labor—are essential to every plant operation. But they vary in locational importance from one type of plant to another, and one major factor usually dominates the selection of a general area for a new plant location.

Most food processing industries, for example, are heavy consumers of raw and intermediate materials but they are not necessarily located with primary reference to the source of materials. In fact, many of the most important food processing industries, such as bread and bakery industries, the soft drink and other beverage industries, are most economically located close to large urban markets. The expansion of the cotton textile industry in the South is sometimes explained in terms of proximity to a source of raw cotton. However, the principal factor in locating textile factories, as demonstrated in the recent controversy over the shift of the textile industry out of New England, is the availability and cost of labor, not closeness to raw materials.¹⁴

The foregoing discussion emphasizes the point that each industry must be appraised individually in terms of its locational characteristics in order to identify the industries that satisfy the locational criteria for the rural industry group.

¹³ For a more detailed statement of the factors influencing business decisions on plant location, as well as a description of the locational characteristics of a number of specific industries, see *Why Industry Moves South* by Glenn E. McLaughlin and Stefan Robock, National Planning Association, Washington, D. C., 1949.

¹⁴ See, for example, U. S. Congress, Congressional Record Appendix A 2081, "New England Cotton and Rayon Mills," Washington, Government Printing Office, March 28, 1952. "There has been a great deal of misunderstanding as to the reasons for the high cost position of the New England mills. . . . The Commission, made up of representatives of labor and industry, concluded that labor costs constituted the major factors causing the competitive disadvantage of the industry in the area."

Rural Industries in the National Economy

The most comprehensive source of data on all types of manufacturing is the Census of Manufactures, which in its most detailed breakdown classifies all manufacturing into 453 so-called "four-digit" industries. On the basis of the location criteria mentioned briefly above, the author has identified 41 of the 453 industries as rural industries¹⁵ (see Table I).

Importance of Rural Industries as a Source of Employment

In 1947, these 41 rural industries employed 1,200,000 production workers out of a national total of about 12,000,000 in all manufacturing. The breakdown by general type of rural industry was as follows:

	Production Workers 1947		Increase In Production Workers 1939-47	
	Number	Per Cent of Total	Number	Per Cent Change
Agricultural Rural Industries	544,804	4.6	153,231	40
Forestry Rural Industries	609,785	5.1	171,966	39
Rural Market Industries	66,840	.6	32,632	95
Rural Industries—Total	1,221,429	10.3	357,829	41
All U. S. Manufacturing	11,916,188	100.0	4,107,983	53

Employment was highly concentrated within each of the rural industry groups. Meat packing and canning and preserving accounted for over half of the 545,000 workers in agricultural rural industries. The sawmill and planing mill industry and the paper and board mill industry employed over 80 per cent of the 610,000 production workers in forestry rural industries. And the prepared animal feeds industry had 60 per cent of the 67,000 production workers in rural market industries.

Employment Trends in Rural Industries and Future Potentials

Recent employment trends in rural industries are not very encouraging. From 1939 to 1947, employment in rural industries expanded, but at a lesser rate than for all manufacturing. Approximately 360,000 new jobs were created for production workers during this period of unprecedented expansion. This represented an increase of 41 per cent over 1939 for rural industries as against 53 per cent for all manufacturing.

Most of the new jobs in agricultural rural industries were in the meat

¹⁵ It should be cautioned, however, that the Census of Manufactures does not lend itself to a precise classification of industries on the basis of location factors. For example, the pulp mill category includes plants using rags and waste paper as well as those manufacturing pulp from wood. The mills using waste paper and rags are most likely to be located close to urban centers rather than to forests. Other short-comings of the best available statistics are also involved in this locational analysis. In the author's opinion, however, the data are adequate and meaningful for this analysis.

packing, canning and preserving, frozen foods, concentrated milk, and natural cheese industries (see Table I). In fact, these five industries, listed in order of importance, accounted for more than 70 per cent of the increase in the agricultural industry group. Other industries in which the rate of increase was high, but the number of new jobs relatively small, were the liquid, frozen and dried egg industry, soybean oil mills, pickles and sauces and the wines and brandy industry.

Although the agricultural rural industries group as a whole experienced an over-all gain in employment, the number of production workers in some of the important individual industries declined substantially. Cottonseed oil mills employed about 3,000 fewer workers in 1947 than in 1939. Employment trends in cottonseed oil mills are largely explained in terms of reduced cotton and cottonseed production. Over this same period, employment in cigarette factories declined by almost 2,000 workers. Even though cigarette production doubled from 1939 to 1947, employment in cigarette factories dropped over the same period because of technological progress in the industry. One major development reducing labor requirements was an increase in the speed of cigarette manufacturing machines of at least 30 per cent over the last 10 years.

In the forestry rural industries group, the employment gains over the period 1939 to 1947 were almost completely accounted for by five industries—sawmills and planing mills, pulp mills, paper and board mills, plywood mills and paper coating and glazing (see Table I). Employment in sawmills and planing mills alone increased by 115,000, accounting for 67 per cent of the gain in the forestry group. At least a part of this gain, however, was due to better coverage of small mills in the 1947 Census than in 1939.

In the rural market industries group as a whole, employment expanded at a much faster rate than in the other rural industry groups and even faster than in manufacturing as a whole. As shown in Table I, the prepared animal feeds industry employed 160 per cent more production workers in 1947 than in 1939. The fertilizer industry also accounted for a relatively large increase in employment over the same period. Fertilizer mixing plants, however, experienced only a small increase in employment due to technological labor-saving innovations such as electronic scales, a continuous mixing process, and conveyor systems for handling raw materials.

Trends in Number of Establishments

The trend in number of establishments is significant as an indicator of the possibilities for new plants and new plant locations. The summary for the rural industry groups is as follows:

	Number of Establish- ments 1947	Change 1939-47	Average Size— Production Workers per Establishment 1947
Agricultural Rural Industries	13,783	-1,601	40
Forestry Rural Industries	21,038	11,764	29
Rural Market Industries	3,393	1,397	20
All U. S. Manufacturing	240,881	67,079	50

In the agricultural rural industry group, the total number of establishments declined by 12 per cent, or 1,600 establishments, from 1939 to 1947. It is not surprising that the number of establishments declined in all the industries that experienced employment losses. But it is significant that the number of establishments declined in several important industries concurrently with expansions in employment (see Table I). This trend toward fewer but larger plants was sharply evident in the flour and meal, wholesale poultry dressing,¹⁶ creamery butter, and natural cheese industries.

On the other hand, sizeable increases in the number of establishments occurred in several large and expanding agricultural rural industries. In the wholesale meat packing industry, almost 800 additional establishments existed in 1947 as compared to 1939. The canning and preserving, the pickles and sauces, frozen foods, and liquid, frozen and dried eggs industries were other types of processing in which the number of establishments increased significantly.

In contrast to the over-all decline in the agricultural rural industry group, the number of establishments increased in both the forestry and rural market industry groups from 1939 to 1947 (see Table I). The gain in the forestry group, due almost completely to an increase of almost 12,000 in the number of sawmills and planing mills, was in part a result of better coverage of small mills in the 1947 Census enumeration than in 1939. The increase in the number of establishments in the rural market industry group was accounted for almost completely by the 1,300 additional establishments in the rapidly expanding prepared animal feed industry.

Size of Establishments

The relatively small number of workers per establishment in rural industries, as shown above, has several implications. On the one hand, the small size of plant suggests that entry of additional establishments into these fields may not require large amounts of investment. On the other hand, it

¹⁶ For further detail on recent developments in large scale poultry dressing see McLaughlin and Robock, *op. cit.*, pp. 58-59.

suggests that a large number of establishments are required in most fields to employ any substantial number of workers. It is apparent also that the supply of raw materials is not heavily concentrated geographically, as in the case of many minerals, and that a relatively small plant can process the available raw materials for a rather large area.

There is considerable variation in size of plant within the major groups and within specific industries. However, the generalization as to relatively small plants in rural industry fields seems to be valid. Within the agricultural group, the industry averages range from only six workers in natural cheese plants to 912 workers in cigarette plants. Forestry rural industries vary in average size of establishment from 19 workers in sawmills and planing mills to a high of 200 workers in pulp mills. Within the rural market industries group, the range in average size of establishment is narrower—from 15 workers in feed mills to an average of 93 production workers in fertilizer plants.

Earnings per Worker in Rural Industries

A final important factor in appraising rural industries as a source of off-farm employment is the matter of earnings. In all three of the rural industry groups, the average earnings of production workers in 1947 was significantly less than for all workers in manufacturing. As shown in Table I, earnings in the agricultural industries averaged 10 per cent below the average of \$2,538 for all manufacturing. Within the group, earnings ranged from a low of \$1,460 per year in tobacco stemming and redrying to a high of \$3,333 per worker in the malt industry. In the forestry rural industries, earnings averaged 12 per cent below all manufacturing and ranged from a low of \$1,532 per year in cooperage stock mills to a high of \$2,993 in shingle mills. In the rural market group, earnings averaged 14 per cent below all manufacturing and varied from a low of \$1,679 in fertilizer mixing plants to a high of \$2,324 in the processing of prepared animal feeds.

A satisfactory explanation of the lower level of earnings in rural industries would require considerable additional investigation. It is apparent, however, that some of the more relevant factors involved are the generally low level of skills in many rural industries, the regional and urban-rural wage differentials, and low degree of unionization.

Rural Industries in the Economy of the Southeast

Rural industries as a source of off-farm employment are of special interest to the Southeast.¹⁷ The region needs an unusually large number of

¹⁷ Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia.

off-farm jobs, because agriculture in the Southeast is characterized by low income and an extremely large amount of underemployment.

The employment situation and trends in southeastern rural industries can be summarized as follows:

	Production Workers 1947		Increase in Production Workers 1939-47	
	Number	Per cent of Total	Number	Per Cent Change
Agricultural Rural Industries	88,723	6.7	10,539	12
Forestry Rural Industries	172,600	13.0	73,704	75
Rural Market Industries	15,957	1.2	6,000	60
Rural Industries—Total	277,280	20.9	90,243	48
All Manufacturing Industries	1,324,240	100.0	411,947	45

One important characteristic of the Southeast is that rural industries are twice as important, as a source of industrial employment, as in the nation generally. In 1947, these industries accounted for 277,000 out of a total of 1,324,000 production workers in the region, or 21 per cent of total manufacturing employment as against only 10 per cent for all United States manufacturing.

Another important characteristic of the Southeast, as shown in Table I, is the heavy concentration of employment within a small number of rural industries. The three tobacco industries provided almost 60 per cent of the 1947 employment in the agricultural group and were highly localized in the three states of Virginia, Kentucky, and North Carolina. In the forestry rural industry group, 75 per cent of the total number of production workers were in sawmills and planing mills.

Employment in rural industries expanded significantly in the Southeast over recent years. But a continuation of past trends, such as the increase of 90,000 production workers over the eight-year period from 1939 to 1947, will have little impact on the problem of off-farm employment for more than a million farm workers in the Southeast. Furthermore, even this relatively small increase in employment must be considered as an overstatement because of the great importance in the Southeast of the better coverage of small sawmills in the 1947 Census.

Within the agricultural rural industry group, employment gains were disappointingly small. The net increase of only 10,539 workers, or 12 per cent, over the eight-year period, compares with a 40 per cent gain for the same industry group in the nation.

Two of the most important industries—cigarette and cottonseed oil mills—showed actual declines in employment. Technological developments in cigarette manufacturing and the declining regional importance of cotton suggest that these employment trends will not be reversed in the future.

The most promising fields for new jobs appear to be in meat packing, poultry dressing, canning and preserving, frozen foods, and natural cheese. Expansion in these industries will largely depend, of course, on the continued development of dairy and beef cattle in the Southeast and increased production of fruits and vegetables. In any event, the recent trends suggest that the total number of new jobs likely to be created in these fields will not be very significant in terms of the broad underemployment problem.

In contrast to the agricultural processing field, the forestry industry group appears to be relatively promising. Although the additional employment in sawmills shown for 1947 as compared to 1939 overstates actual events, smaller but yet substantial employment increases occurred in the paper and paper products industries, plywood mills, and cooperage stock mills (see Table I).

Forests of the Southeast are the most extensive in the nation and the region offers great possibilities for intensive forestry development because average density is low and the annual growth rate is high. The recent expansion of pulp and paper mills in the Southeast has greatly stimulated improved forestry practices and the more intensive development of forest lands. But the possibilities for reducing labor requirements through technological improvements are also great in the forestry industry field.

The rural market industries group experienced a relatively high rate of expansion from 1939 to 1947, but new jobs were few. The prepared feed industry, in particular, expanded very substantially in response to the growing importance of livestock and poultry in the region. The fertilizer industry also showed employment gains but the regional increase of 44 per cent was below the 58 per cent in the nation as a whole. This is consistent, of course, with the fact that fertilizer use has been expanding more rapidly in areas like the Midwest than in the South where heavy use of fertilizer has been common for many years.

In terms of additional rural industry establishments, the trend appears to be more encouraging in the Southeast than in the nation as a whole as shown below:

ESTABLISHMENTS IN SEVEN SOUTHEASTERN STATES

	Number 1947	Change 1939-47	Average Number Production Workers 1947
Agricultural Rural Industries	1,421	-126	62
Forestry Rural Industries	8,669	5,157	20
Rural Market Industries	511	103	31
	<hr/>	<hr/>	<hr/>
Rural Industries—Total	10,631	5,134	26
All Manufacturing Industries	24,627	8,898	54

Whereas new rural industries accounted for only 17 per cent of the

gain in the number of all manufacturing establishments in the nation, they accounted for 58 per cent of the gain in the Southeast.

In relating these gains to future prospects for new plants, several qualifying factors must be kept in mind. Within the agricultural industries group, there was a net loss in number of establishments from 1939 to 1947, due to substantial declines in the number of flour and meal operations, creamery butter plants, and cottonseed oil mills (see Table I). With the exception of cottonseed oil mills where employment declined, this indicates a movement to fewer and larger plants. The increased number of forestry establishments can be attributed almost completely to an increase of more than 5,000 in the number of sawmills and planing mills. Within the rural market industries, the number of fertilizer mixing plants in the Southeast declined substantially from 1939 to 1947.

In terms of increased worker income in the Southeast, the pattern of earnings in the rural industries presents a mixed picture. The meat packing industries, which experienced the greatest employment gain in the agricultural group, provide relatively high earnings \$2,150 per year as against \$1,903 for all workers. On the other hand, the canning, poultry dressing, and frozen foods industries, which have also been important sources of new jobs, provide extremely low annual earnings. In fact, production workers in the frozen food industry averaged only \$763 a year for an average of only 24 hours per week over the year.¹⁸

Earnings in the forestry industries also vary widely. Workers in sawmills and planing mills, the most important source of new jobs, averaged only \$1,281 per year in 1947 for full time employment, whereas workers in the important and expanding paper and paper products fields average as high as \$2,692 per year.

Summary and Conclusion

Rural industries are an important source of manufacturing employment in the United States, accounting in 1947 for about 10 per cent of the total number of production workers in manufacturing. However, from 1939 to 1947, the number of jobs in rural industries expanded at a lesser rate than for all manufacturing. The 360,000 new jobs created in rural industries during this eight-year period of unprecedented national expansion look rather small against an over-all problem of more than 2,500,000 under-employed workers in American agriculture.

¹⁸ The seasonal factor cannot be adequately appraised from the Census of Manufactures data because the production worker data represent monthly average employment. With exception of frozen foods, canning and preserving, and vinegar and cider, the annual earnings in Table I represent payment for an average of from 37 to 51 hours per week per production worker.

The regional aspects of the problem are of special importance. Agricultural underemployment is most acute in the Southeast. In this seven-state area, there is an estimated potential of a million farm workers for all-farm employment, even after a decline of 770,000 in the number of farm workers from 1940 to 1948 and a net migration of more than 2,000,000 persons out of the area over the same period.¹⁹ Furthermore, Southeastern farms continue to produce something like 72,000 new entrants to the labor force each year that are not needed in agriculture.²⁰

Against a problem of this size in the Southeast, the expansion of rural industries cannot be an important solution. Only 90,000 new production jobs in rural industries were created in the area over the entire eight-year period from 1939 to 1947, or slightly more than 11,000 jobs per year. The forestry industries seem to offer the best prospects for a significant number of new jobs in the region, but the possibilities for reducing labor requirements through technological developments are also great in this field.

Rural industries have certain other unfavorable characteristics. In both the nation and the Southeast, a large number of new establishments are required to create any sizeable increase in jobs because the average size of rural industry establishments is relatively small in terms of production workers. Also, workers employed in rural industries receive a lower annual wage on the average than the level for manufacturing in general.

From the standpoint of attracting new rural industries to an area, it should be noted also that, although the number of establishments increased from 1939 to 1947 in the forestry and rural market industry groups, the number of plants in the important agricultural processing industries actually declined.

This analysis suggests that the problems of industrial development as related to underemployment in agriculture should be approached more broadly than through reliance on the growth of rural industries.²¹ The expansion of employment in rural industries should, of course, be encouraged. But the serious limitations in this direction must be recognized and the need for a more detailed understanding of the specific rural industries should be emphasized.

The major efforts of those interested in creating off-farm jobs should be

¹⁹ *Handbook of Regional Statistics*, Joint Committee on the Economic Report, Government Printing Office, Washington, D. C., 1950, p. 207.

²⁰ In 1945, there were 4,577,000 persons 14 years old and over on farms in the seven states. At the prevailing replacement rate, the number is increasing at the rate of 152,000 per year, and 72,000 of these will enter the labor force.

²¹ These conclusions as to rural industries are not applicable in many foreign underdeveloped areas where capital is short, labor costs are low and highly industrialized competition is not very important. See Henry G. Aubrey, *op. cit.*, for an excellent analysis of rural industries in under-developed areas.

focused in directions other than rural industries. In the manufacturing field, some of the more promising long-run opportunities are in the machinery industries. The electrical and other machinery industries alone accounted for 1,099,000 new production workers from 1939 to 1947, or over one-fourth of the national expansion in manufacturing employment. Only a very small share of this expansion occurred in the Southeast.

The major location factor in many machinery fields is a source of skilled and semi-skilled workers. Thousands of workers have migrated out of the Southeast to work in these industries. Agricultural leaders should be interested in programs for training workers for these fields and in efforts to persuade more of these rapidly-expanding and high-wage industries to expand close to the source of labor rather than draw supplies of labor out of the Southeast.

Other outstanding employment opportunities are in the primary metals, metal fabricating, and chemical fields. These three broad industry groups accounted for 900,000 new manufacturing jobs in the nation from 1939 to 1947. Many of the metal and chemical industries are attracted by low-cost power, industrial water resources and by the availability of minerals. The Southeast has made significant progress in some of these fields, such as the manufacture of aluminum and heavy chemicals, but there are still large opportunities for expanding off-farm employment through improving the availability of energy and mineral resources in the Southeast.

The so-called "rural industry" may have special interest and an emotional attachment for people in agriculture. But the solution to the problem of non-agricultural employment, for people moving out of agriculture, lies largely in other directions. The other fields of industrial and trade and service²² employment warrant the strong interest and serious attention of people interested in influencing the agricultural future of the Southeast.

²² The trade and service fields are another major area for expanding employment. However, these activities are not basic generators of income in the same sense as farming, manufacturing, and mining.

WEAK POINTS IN THE JAPANESE LAND REFORM PROGRAM*

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SOCIAL scientists who have written about the Japanese land reform program have generally agreed that it was an important achievement of the Allied occupation.¹ However, weak points in the program are apparent if one asks the following questions: Has the redistribution of income been equitable? Has less inequality resulted? Will Japan's scarce agricultural resources be allocated to those who can use them most productively? Will farm incomes be less unstable than formerly? Even though the effectiveness of the program depends on the answers to these questions, they have not received adequate consideration.

Compulsory Land Sales and Rent Ceilings

Two aspects of the program—the compulsory sale of agricultural land and rent ceilings included in the laws—have altered the distribution of income. Both the justice of the reform and the effect on inequality depend on the nature of these changes.

Certain owners were forced to sell land to the government: (1) absentee landlords, (2) owner operators who cultivated more than the maximum amount permitted, and (3) lessors—either owner operators or resident landlords—who held more land than was allowed.² In the majority of

* This program was based on the Owner Farmer Establishment Special Measures Law and the Agricultural Land Adjustment Law issued by the Japanese Cabinet on November 21 and December 26, 1946. For a detailed account, see L. I. Hewes, Jr., *Japanese Land Reform Program*, Natural Resources Section Report No. 127, Tokyo, Supreme Commander Allied Powers, March 15, 1950.

¹ See Kurt Singer, "Landlords and Tenant Farmers of Japan," *Economic Record*, Vol. XXIII, December, 1947, pp. 238-249; William M. Gilmartin and W. I. Ladefjinsky, "The Promise of Agrarian Reform in Japan," *Foreign Affairs*, Vol. XXVI, January, 1948, pp. 312-324; L. I. Hewes, Jr., "On the Current Readjustment of Land Tenure in Japan," *Land Economics*, Vol. XXV, August, 1949, pp. 246-259; W. McMahon Ball, *Japan, Enemy or Ally?*, New York: John Day Company, 1949; G. T. Trewartha, "Land Reform and Land Reclamation in Japan," *Geographical Review*, Vol. XL, July, 1950, pp. 376-396; Arthur F. Raper, "Japanese Village Life," *Rural Sociology*, Vol. XVI, March, 1951, pp. 3-16; Mark B. Williamson, "Land Reform in Japan," *This Journal*, Vol. XXXIII, May, 1951, pp. 169-176.

² Persons who did not live in the locality where their property was situated were not permitted to own any farm land. Although there were exceptions, the laws also restricted the area that owner operators might cultivate to 7.5 acres on the islands of Honshu, Shikoku, and Kyushu and 30 acres on Hokkaido. In addition, either owner operators or non-cultivating resident landlords could own for rental purposes no more than 10 acres on Hokkaido and 2.5 acres on the other islands of Japan. Residents of the community were permitted to be lessors in order to provide for those families that were unable to cultivate their land because of illness, business retirement, or

cases, the tenants who had been cultivating this land were entitled to buy it. From 1946 to 1949 approximately three million households purchased land from the government. Obtaining ownership benefited the buyers both because they were charged prewar land prices in spite of severe inflation and because rates on farm loans were kept far below customary levels.³ Buyers who had been full tenants and whose rents amounted to one-half the output were now entitled to the entire crop—thus increasing their incomes 100 per cent.⁴ Those whose rents had been less than 50 per cent or who had been partial owners did not gain as much. However, the purchasers paid something and would have to meet interest payments on their loans at 3.2 per cent, property taxes, and other expenses the former owners had paid. The landlords not only were compelled to sell their property at prewar prices, but also were paid in 24-year annuity bonds which inflation made almost worthless.

The rent ceilings of 25 per cent for paddy and 15 per cent for upland fields benefited tenants at the expense of their landlords. Because rents had usually been twice as high as the ceilings, landlords' returns were cut approximately in half, and the incomes of their tenants were increased as much as 50 per cent—depending on the type of field cultivated and on whether they were full or part tenants.

In several ways the redistribution of income was inequitable because it did not affect persons with the same incomes in the same way. Only a few examples need be mentioned. Poor families that were not farm tenants received no aid, and many wealthy persons who did not own land gave up nothing; yet more than half of the gainfully employed were neither farmers nor landlords. In addition, the laws did not raise the incomes of owner cultivators. This is significant because more than one-third of the farmers had owned at least 90 per cent of their fields. Too, surveys by the Ministry of Agriculture and Forestry have shown that part tenants received the largest average net returns per year, owner cultivators were next, and full tenants were last.⁵ A third example of inequity

death. After the reform, approximately 12 per cent of the agricultural land was owned by them. The household was designated the ownership unit to prevent evasion of the law by distributing lots among members of the same family.

³ Gilmartin and Ladejinsky reported that the prescribed land prices were one-tenth or less the levels in the black market. See *op. cit.*, p. 319.

⁴ Actually, the improvement in the standard of living of Japanese farmers was less than one would expect because the post-war controls over agricultural products combined with inflation partially offset the effects of the land reform program.

⁵ Seiei Wakukawa, "The Japanese Farm-Tenancy System," Chap. V, Douglas G. Haring, Ed., *Japan's Prospects*, Cambridge: Harvard University Press, 1946, p. 139. The higher rates of tenancy in the rich paddy fields than in the poor upland farms may be related to the high average returns of part tenants. In 1934, more than 53 per cent of all paddy land was under tenancy, while slightly under 40 per cent of the dry fields fell in that category (*ibid.*, p. 119).

was that the sale of farms to those who had been cultivating them benefited the rich more than the poor tenants. Those who tilled large fertile fields were entitled to buy them, and poor farmers usually purchased smaller and less productive lots because they happened to be on them.

The land reform program has eliminated inequalities due to large holdings. This is because absentee ownership was made illegal and maximum limits were placed on the number of acres that owner operators and resident landlords might own. Before the reform, ownership was concentrated. Three per cent of the landlords possessed 30 per cent of the cultivated and nearly one-half of the tenanted land. On the other hand, the average Japanese estate was small, and lessors were numerous. Table 1 shows the number of lessors holding different amounts of land in 1940.

TABLE 1. NUMBER OF OWNERS LEASING DIFFERENT AMOUNTS OF LAND, 1940*

Amount of Leased Land ^a (One cho or chobu equals 2.45 acres)	Number of Owners
More than Five Chobu	99,000
One Cho to Five Cho	287,000
Less than One Chobu	More than 1,352,000
Total	More than 1,738,000

* Source: Japanese Agricultural Land Statistics, Natural Resources Section Report No. 101, Tokyo: Supreme Commander Allied Powers, 1948, p. 31.

Because ownership was widely distributed, some landlords who lost property may have been little or no better off than some of the recipients. An interesting fact is that approximately 38 per cent of the lessors were owner operators of other parcels of land.⁶ Therefore, the regulations reducing rents and limiting the ownership of leased fields have cut the incomes of some cultivators.

Marked differences in the amount of land possessed by families existed after the reform, although the number of large holdings was smaller. Table 2 shows the percentage distribution of owner households, both cultivating and non-cultivating, before and after the reform, by the amount of land owned. Although the differences in farm size could be offset by variations in quality, there is no reason to believe that they were. These differences will be reflected in continued inequality in the incomes of farm land owners.

Unfortunately, data are not available to show whether the landlords

⁶ In 1940, there were 1,072,000 non-cultivating lessors, 52,000 owner farmers who concurrently were lessors of more than 2.45 acres of cultivated land, and more than 614,000 owner farmers who were lessors of less than 2.45 acres. See *Japanese Agricultural Land Statistics*, Natural Resources Section Report No. 101, Tokyo: Supreme Commander Allied Powers, 1948, p. 31.

who lost property were better off on the average than the tenants who gained from the reform. However, both the nature of the reform program and the information presented in Tables 1 and 2 indicate that the changes in the income structure were slight and the principal effect on income distribution resulted from the virtual confiscation of the farm property of a relatively small number of wealthy families.

Protections for New Land Owners

The reform program has changed the method of allocating fields to farmers. In general, government controls have been substituted for

TABLE 2. ESTIMATED CHANGES IN THE DISTRIBUTION OF OWNER HOUSEHOLDS, BOTH CULTIVATING AND NON-CULTIVATING, BY AMOUNT OF LAND OWNED, AUGUST 1, 1947, TO DECEMBER 31, 1948*

Amount of Land Owned (in cho)	Per Cent of Owner Households		
	1 Aug. 47	31 Dec. 48	Net Change
0.0-0.5	48.1	49.2	1.1
0.5-1.0	24.9	25.5	0.6
1.0-3.0	21.3	23.7	2.4
3.0-5.0	3.0	0.9	-2.1
Over 5.0	2.7	0.7	-2.0
Total	100.0	100.0	

* Source: L. I. Hewes, Jr., *Japanese Land Reform Program*, Natural Resources Section Report No. 127, Tokyo: Supreme Commander Allied Powers, March 15, 1950, p. 92.

market procedures. Many of these allocative controls are types of non-price rationing which arise when prices are established by the government at levels where the quantity demanded is greater than the quantity supplied. It is significant that the new tenure system has disregarded almost completely the desirability of allocating farms in the future to the most efficient operators. Yet, because natural resources in Japan are so scarce relative to labor, this consideration must be of great importance. Waste tends to result whenever a legal price is established for a resource lower than it otherwise would be, for at the lower price the resource may be employed in less productive ways.

Families that obtained ownership of land during the reform have been carefully protected against future loss of the property. The government sold the farms at low prices, and if borrowing were necessary, government loans on easy terms were available. In addition, in special circumstances of distress, interest payments on these loans are to be reduced. The reform laws also protected tenants from dismissal.⁷ Landlords are not allowed to

⁷ However, immediately before the enactment of the reform laws, landlords attempted to protect themselves by becoming farm operators and evicted thousands of

evict tenants without official approval; and verbal agreements, which owners could terminate on short notice, are prohibited. Finally, the reform laws require approval by the government of all contracts concerning farm property. A significant aspect of these policies to protect the farmer's "right to cultivation" is that if the Agricultural Land Commissions protect either inefficient farm debtors from foreclosure or incompetent tenants from dismissal, farm output will suffer.

The reform laws established maximum and minimum limits to the number of acres allocated to each farmer, so that there were exceptions to the rule that fields were sold to the families cultivating them. Holdings of owner operators were limited in size in order to spread the land among as many households as possible. On the other hand, tenants operating less than half an acre were not permitted to buy their fields. This was either because they were part-time farmers or because such holdings were insufficient to provide an adequate income from farming. These policies may also result in a wasteful use of resources. Persons who already own maximum-size farms, for example, might be able to employ additional land more productively than can present or other possible cultivators.

The reform laws not only established rent ceilings on fields tilled by tenants, but also prescribed a formula for computing the maximum prices at which agricultural land could be sold in the future. The purpose was to protect farmers from "excessive" land prices. However, setting maximum prices for rents and agricultural land sold will tend to make the existing allocation of farm land rigid and to discourage the mobility of farm labor. This is undesirable because of the constantly changing composition and capabilities of farm households. Continuous adjustments are necessary if: (1) farms are to be put in the hands of the most productive farmers or, (2) if persons are to be employed where their services are most valuable.

Although evidence is not yet available to show whether the turnover of farm land has actually declined, these price controls will undoubtedly tend to have this effect. For example, the price and rent ceilings in many cases prevent an owner from giving up farming, even though his services might be more valuable in another occupation. Instead, an owner is encouraged to continue farming because the decrease in his property income if he leased or sold his lots would probably be greater than the possible

tenants. A rough estimate by prefectural government authorities indicated that during the 10 months following August 15, 1945, there were 250,000 such cases. See Shinrokuro Yamaguchi, *Some Aspects of Agrarian Reform in Japan*, Tokyo: International Publishing Company, 1948, pp. 24-31, and L. I. Hewes, Jr., *Japanese Land Reform Program*, *op. cit.*, pp. 76-80.

gain from employment in an alternative occupation. In addition, an owner is induced to cultivate his fields even though he is less efficient than other possible operators because his return from farming may still be larger than the maximum rent a more skilled cultivator would be allowed to pay.

The principal error has been the attempt to control land prices, although this policy may have had some advantages at the time of the reform. If the government had sold the redistributed fields to farmers who bid the highest price, rather than to existing cultivators at prewar prices, an excessive amount of relocating might have been required. Certainly after the reform the government should have allowed free prices to ration agricultural property. Price ceilings were not a necessary part of the Japanese land reform program. With or without price controls, its main achievement—the break-up of large estates—could have been realized.

Rents Now Payable in Cash

An important change affecting the stability of the incomes of tenant farmers was the requirement that rents be paid in cash rather than in kind. Japanese rents have typically been stated in fixed terms—a certain quantity of produce or money—even though the legal rent ceilings were a percentage of the yield.⁸ When fixed rents are payable in cash, a tenant can meet his rent payments more easily if product prices are high. But if prices drop, the value of the entire crop may be less than the cash rent. In contrast, when fixed rents are payable in kind, product prices do not affect a tenant's ability to meet his obligations. It is interesting that before the reform rents payable in kind were on the average higher than cash rents.⁹ Tenants seem to have been willing to pay more on the condition that they might pay in kind. Apparently, they preferred incomes that were less unstable.

Actually, during the occupation prices of agricultural products were legally fixed, and market controls required tenants to deliver quotas to the government, which then paid both landlords and tenants their shares in cash based on the official crop prices. However, when postwar controls are removed, tenants will pay cash rents directly to landlords.

The program also adversely affected the security of farm families who owned land before the reform. The combination of officially fixed land prices and inflation almost completely wiped out the value of farm property as a marketable asset. These farm households have suffered

⁸ However, in some contracts when the crop was smaller than usual through no fault of the tenant, the rent was reduced and even cancelled. See W. I. Ladejinsky, "Landlord vs. Tenant in Japan," *Foreign Agriculture*, Vol. XI, June, 1947, p. 86.

⁹ Wakukawa, *op. cit.*, p. 146

capital losses, either realized or unrealized, and they have lost the security formerly provided by their farm wealth.

Elimination of tenancy also required some farmers to assume additional risks, for cultivators who were tenants had avoided the capital risks associated with farm ownership.¹⁰ Although prices of farms in Japan are now fixed by law, risks are present for two reasons: (1) real values fluctuate with prices in general, and (2) the government may change its formula for computing farm prices. However, it must be emphasized that during the reform the purchasers of land actually have assumed very small capital risks because of the low prices paid.

Will Occupation Goals Be Achieved?

The broad goals of the occupation were to eliminate military aggression, develop democracy, and defeat communism. The land reform program was considered one of the most effective instruments for achieving these objectives. It was expected, for example, that the reform program would reduce agrarian discontent and thus remove one of the causes of Japanese imperialism. A second point of view was that the redistribution of land ownership would contribute to the development of democracy both by weakening the power of the reactionary landlords and by stimulating the interest of farmers in politics. Finally, it was believed that because these Allied reforms would improve the lot of poor tenants, the masses in Japan and in other countries would follow the leadership of the capitalist democracies rather than that of the communist dictatorships.

The weak points in the land reform program pose doubts as to its success in achieving these objectives. It is especially important that the wasteful allocation of resources in the new system of land tenure may diminish future agricultural output. This would probably have undesired effects both on the political stability of Japan and on the prestige of the occupying powers.

However, it has been argued that the land reform will tend to raise crop yields. Several statistical studies made from 1890 to 1943 indicate that the average output of owner farmers was larger than that of tenants, although they cultivated the same grade of land.¹¹ The reason given for the better performance of owners is usually that private ownership provides more effective incentives. In interpreting these statistical studies, an important fact is that rents in Japan are customarily stated in fixed terms, but vary with the productivity of the field. Because of this, tenants

¹⁰ During the reform, tenants occupying property to be redistributed either had to purchase it or move. The percentage of households owning at least 90 per cent of the fields they tilled increased from 36.5 per cent to 70 per cent. See Hewes, *Japanese Land Reform Program*, op. cit., p. 83.

¹¹ *Japanese Agricultural Land Statistics*, op. cit., pp. 59-60.

in Japan have inducements to work hard that are no different from those for owner operators. They receive a residual return after paying fixed rents and other costs, so that their incomes tend to vary with effort. In addition, since rents vary with the productivity of the field, the statistical studies may reflect the tendency of tenants to understate their crop in order to keep their rents low.

The land reform program has changed both the property rights conferred by land titles and the rights of those who desire to be cultivators. Certainly, by restricting the choices of individuals concerning the number of acres owned or cultivated, the prices paid, and the methods of payment, these laws are a step away from an individualistic economic system.¹² This is significant to social scientists who believe that a high degree of economic freedom fosters the growth of democratic political institutions.

The inequitable redistribution of income and wealth may impair the acceptability of the reform. If the Japanese people feel that these laws are unfair, enforcement will probably be weak and cooperation unsatisfactory. The government of Japan under independence may repudiate policies enacted during the occupation.

Land reform programs are of interest at the present time as methods of raising the standard of living in "backward" areas. Some writers, for example, believe that Point Four aid should be given to countries only on the condition that they adopt desirable reforms. The shortcomings of the Japanese experience may prove useful in developing and evaluating other programs of agricultural reform.

¹² The frequent statement that the land reform removed feudalistic institutions in Japan's economy is probably misleading. Professor Edwin O. Reischauer writes that the Japanese farm economy should not be compared to the recent feudal estates of Eastern Europe. See *The United States and Japan*, Cambridge: Harvard University Press, 1950, p. 63.

STOCKS AND STABILITY*

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PROVIDED that the exchanges are free from monopolistic or fraudulent activities, the classical concept of speculation as an economically productive function would probably be unchallenged by the majority of contemporary economists. Many of those who depart markedly from much of the classical doctrine unhesitantly accept the traditional view of competitive speculation.¹ On the other hand, several eminent economists have criticized the traditional theory of competitive speculation on the grounds that the underlying assumptions do not always prevail in the real world. In particular, it has been advanced that speculation in storable commodities on organized exchanges may, under certain conditions, contribute to price instability, whereas classical theory holds that competitive speculation reduces price fluctuations which arise from changes in non-speculative demand and supply.

It is the purpose of this paper to examine these criticisms in the light of empirical evidence and to show that, with regard to several storable farm products, the traditional theory appears to be correct.

The Classical Theory

It will suffice to state very briefly the classical concept that competitive speculation is beneficial to society. The speculator's function is to move goods from a point of low utility to a point of high utility, thus bringing the allocation of goods nearer the optimum whether the point is a position in time or in space. If the speculator makes a profit by the transaction, it is his reward for transferring goods from less important to more important uses. And this is reversible, for he will make no profit or will suffer losses by moving goods to places of equal or less usefulness.

In terms of prices, the speculator will buy when he believes the current price to be below some "normal" price and sell when he believes the present price to be above the "normal" price. His actions will tend to stabilize prices or at least reduce price fluctuations. Hence, to be successful he must predict correctly. Those who do not have better than average foresight will sustain losses and be eliminated from the speculative market. Thus, over a long period only the successful predictors will stay in the market, profiting both themselves and society.

* The author is indebted to Professor O. H. Brownlee for directing his attention to this problem.

¹ See, for instance, A. P. Lerner, *The Economics of Control*, New York, 1944, pp. 88-95.

Objections to the Classical Theory

However, as has been pointed out by Kaldor,² this analysis assumes that speculative activity is only a small proportion of total market activity. And, while it can influence the extent of price fluctuations, speculative transactions cannot change the direction of price movements. If this condition is not satisfied, i.e., if 'speculators' transactions are a large proportion of total market activity, the traditional argument does not hold and miscalculations may not prove corrective. For it may be sufficient for a small group of speculators to concentrate on other speculators and predict their actions rather than the underlying demand and supply conditions. In this case, a small group could be maintained indefinitely by the losses of a floating population of unsuccessful aspirants to the select body, and speculation as a whole would result in a net social loss. Given these circumstances in a particular market, price fluctuations would be greater than if speculative activity were completely absent.

Professor Schultz has raised a similar argument: "When circumstances are such that those who deal in farm products are motivated into becoming sellers as a consequence of falling prices and conversely as a result of rising prices, the storability of a product acts as a cause contributing to price variations."³

For these situations to be uneconomic and prevail, the conditions previously noted are required: that certain dealers are profiting from the misjudgments of other dealers, which can occur only if speculative transactions are proportionately large. If dealers sell because of falling prices, it can only be that they expect even lower prices in the future, and, if their expectation proves correct, they have acted in a manner promoting price stability. However, if the falling market price is to a large extent a reflection of incorrect speculative foresight, the astute dealer, knowing this, will purchase and profit thereby although the speculative population as a whole suffers a loss.

Explanation of Method

There appears to be no direct method of testing the objections to the classical theory of speculation. But if it can be shown that speculation contributes to price stability, it will follow that speculators as a whole are not operating at a loss.

To gauge the impact of stocks (and hence speculation) on price fluctuations, we may compare the direction of changes in price with the direc-

² N. Kaldor, "Speculation and Economic Stability," *The Review of Economic Studies*, Vol. VII, 1939-1940, p. 2.

³ Theodore W. Schultz, "The Theory and Measurement of Price Expectations," *American Economic Review*, Proceedings, May, 1949, p. 147.

tion of changes in stocks. For speculation to be price stabilizing, it is necessary that a rising price be accompanied by a reduction in stocks and, conversely, a falling price be associated with increasing stocks. Changes in prices and stocks of equal sign would indicate that stocks contribute to price variation.

The empirical observations which were used consist of (1) average price of the commodity during the crop year (selling price weighted by carlot sales) and (2) end-of-year domestic stocks.⁴

Although quarterly data are available, intra-year comparisons of movements in stocks and prices are unlikely to prove fruitful in measuring the effectiveness of speculation. In a domestic market under conditions of constant demand, the price at any moment during the crop year will consist of a constant pure price plus storage costs. Since the latter component is continuously increasing, selling price and stocks will move in opposite directions throughout the year. Departures from this pattern will arise mainly from changes in speculative demand. We would not expect actual consumption to vary substantially over short periods. Inasmuch as there is overlapping of crop years, intra-year price movements may also be affected by conditions abroad.

With annual price data and end-of-year stocks, no similar difficulties are encountered. Between any two years there are no *a priori* reasons for expecting any set pattern of price and stock movements. However, an implicit assumption is that the two measures are indicative of speculative sentiment throughout the year. In general, this will be the case. During any short period of time, the volume of stocks bought or sold must be a very small proportion of total stock holdings at that time. It follows that stock accumulations at any moment are to a large extent reflective of the speculative feeling during a prior period of some duration. By parity of reasoning, the average (weighted by sales) price over a period will not be influenced to a large degree by the price which prevailed during the final days of the period.

Consider now the relation between changes in stocks and expectations. Changes in stock holdings in a positive direction, i.e. stocks in year (t) exceed those held during year ($t-1$), indicate speculative expectation of a price rise. Conversely, (t) stocks less than ($t-1$) stocks reflects speculative pessimism. Thus, we may gauge expectations at any time by comparing present stocks with previous holdings.

To judge the "correctness" of these expectations, it is convenient to distinguish between expectations which apply to the present and immediate future and those which refer to more distant periods. If expectations

⁴ Actually, carry-over stocks, but the time difference of one day is ignored.

are correct in the former or *short term* case, the change in stocks will have a different sign than the change in price from the *previous year* to the present year. Stocks will be price stabilizing if given (t) price $>$ (t-1) price, (t) stocks $<$ (t-1) stocks or conversely, and destabilizing if stocks and price move in the same direction. In the *long term* case, price change is measured with respect to the *future year*. Long term expectations will be correct if given (t) price $>$ (t+1) price, (t) stocks $<$ (t-1) stocks; or given (t) price $<$ (t+1) price, (t) stocks $>$ (t-1) stocks.

It is obvious that only under certain conditions will expectations be correct (price stabilizing) or incorrect in both cases. Assume that in three

CHART 1. POSSIBLE COMBINATIONS OF CHANGES IN STOCKS AND PRICE AND INTERPRETATION OF EACH

Direction of Change in Stocks from Previous to Present Year	Direction of Change in Price from Previous to Present Year	Position of Present Price With Respect to Price in Future Year	Interpretation
-	+	-	Correct for short period only
+	-	+	Correct for short period only
-	-	+	Correct for long period only
+	+	-	Correct for long period only
+	-	-	Correct for both long and short period
-	+	+	Correct for both long and short period
+	+	+	Incorrect for both long and short period
-	-	-	Incorrect for both long and short period

consecutive years, (t-1), (t) and (t+1), outside demand and supply conditions are such that the price is continuously rising. A typical speculator is confronted at some moment in (t) year with the possibility of either buying or selling. If he has, say, short term foresight, he will sell, for, although he "knows" that the price will continue upward for some short time in the future (beyond that, by definition, he has no expectations), he also is aware that he can make no higher profits and may possibly sustain a loss if all speculators wait until the last moment to sell. On the other hand, under exactly similar conditions, a speculator with long term foresight will buy, for he "knows" that the price a year or more in the future will be higher than the current price. Hence, under conditions of rising or falling prices over a period of years, aggregate stock movements will be correct from one viewpoint and incorrect from the other. When the price for any year is above (below) both the past and future prices, stock changes will be correct (incorrect) in both the long and short term cases. These relations are summarized in Chart 1, which shows and interprets the eight combinations of changes which may occur.

Findings

The analysis outlined above has been applied to price and stocks data for three storable farm products: corn, wheat and cotton. For most other non-perishable farm products, complete stock holdings are not available for years prior to 1943. The results are shown in Tables 1, 2 and 3, respectively.

TABLE 1. CORN: AVERAGE YEARLY PRICE AND END-OF-YEAR STOCKS, 1925-1948

Year Beginning October 1	End-of-Year Stocks (Million Bushels)	Average Price per Bushel ^a	Direction of Change From Previous Year:		Position of Present Price With Respect to Price in Future Year
			Stocks	Price	
(1)	(2)	(3)	(4)	(5)	(6)
1925	278	\$.75			
1926	217	.87	-	+	-
1927	92	1.01	-	+	+
1928	147	.92	+	-	+
1929	139	.84	-	-	+
1930	168	.62	+	-	+
1931	270	.36	+	-	+
1932	387	.34	+	-	-
1933	338	.50	-	+	-
1934	65	.86	-	+	+
1935	176	.74	+	-	-
1936	66	1.21	-	+	+
1937	361	.57	+	-	+
1938	584	.48	+	-	-
1939	688	.54	+	+	-
1940	645	.67	-	+	-
1941	492	.79	-	+	-
1942	384	.91	-	+	-
1943	231	1.14	-	+	0
1944 ^b	315	1.15	+	0	-
1945	173	1.04	-	+	0
1946 ^b	285	1.80	+	0	-
1947	125	2.33	-	+	+
1948 ^c	825	1.98	+	-	+
1949 ^c	-	1.29			

^a No. 3 yellow corn, Chicago. Average of daily prices weighted by carlot sales.

^b Direction of price change differed on the several exchanges.

^c Preliminary.

Source: Computed from *Agricultural Statistics*, United States Department of Agriculture, 1936, 1945, 1949, 1950.

Column (4) of each table shows the direction of change in stocks while columns (5) and (6) show the direction of price changes in the short and long term cases, respectively. Data for corn are not available for years prior to 1925, and data for cotton are one year more recent than for wheat or corn.

It will be noted that the price series for each commodity is for a single exchange. In all instances except two for corn and one for wheat, the direction of change in prices was identical for all reporting markets.

Hence, the single series is representative of a weighted series of the prices on all exchanges for all but three years. With appropriate weights unavailable, the direction of price change is indeterminate for the latter cases.

A summary of the observations in Tables 1, 2 and 3 is given in Table 4 with the indeterminate years excluded.

Care should be exercised in comparing the results among products since the time periods covered are not identical. Taking the same period for wheat as for corn, 18 out of 22 years are "correct." In other words, for

TABLE 2. WHEAT: AVERAGE YEARLY PRICE AND END-OF-YEAR STOCKS, 1919-1948

Year Beginning July 1	End-of-Year Stocks (Million Bushels)	Average Price per Bushel ^a	Direction of Change From Previous Year:		Position of Present Price With Respect to Price in Future Year
			Stocks	Price	
(1)	(2)	(3)	(4)	(5)	(6)
1919	145	\$3.00			
1920	127	2.01	—	—	+
1921	114	1.48	—	—	+
1922	137	1.26	+	—	+
1923	144	1.24	+	—	—
1924	115	1.58	—	+	—
1925	105	1.65	—	+	+
1926	122	1.51	+	—	+
1927	124	1.41	+	—	+
1928	247	1.26	+	—	—
1929	291	1.30	+	+	+
1930	313	.82	+	—	+
1931	375	.71	+	—	+
1932	378	.61	+	—	—
1933	273	.91	—	+	—
1934	146	1.16	—	+	—
1935	140	1.26	—	+	—
1936	83	1.47	—	+	+
1937	153	1.28	+	—	+
1938	250	.79	+	—	—
1939	280	.97	+	+	0
1940 ^b	385	.90	+	0	—
1941	631	1.10	+	+	—
1942	619	1.29	—	+	—
1943	317	1.55	—	+	—
1944	279	1.59	—	+	—
1945	100	1.71	—	+	—
1946	84	2.34	—	+	—
1947	196	2.88	+	+	+
1948	307	2.37	+	—	+
1949 ^c	—	2.37			

^a No. 1 Dark Northern Spring, Minneapolis. Average of daily prices weighted by carlot sales.

^b Direction of price change differed on the several exchanges.

^c Preliminary. 1949 price is considered below 1948 price since all other exchanges reported a price decline.

Source: Computed from *Agricultural Statistics*, United States Department of Agriculture, 1936, 1945, 1949, 1950.

TABLE 3. COTTON: AVERAGE YEARLY PRICE AND END-OF-YEAR STOCKS, 1919-1949

Year Beginning August 1	End-of-Year Stocks (Million Bales)	Average Price per Pound in Cents ^a	Direction of Change from Previous Year:		Position of Present Price With Respect to Price in Future Year
			Stocks	Price	
(1)	(2)	(3)	(4)	(5)	(6)
1919	3.6	38.3			
1920	6.5	17.9	+	-	-
1921	2.8	18.9	-	+	-
1922	2.3	26.2	-	+	-
1923	1.55	31.1	-	+	+
1924	1.6	24.7	+	-	+
1925	3.5	20.5	+	-	+
1926	3.8	15.2	+	-	-
1927	2.5	20.4	-	+	+
1928	2.3	19.7	-	-	+
1929	4.5	16.6	+	-	+
1930	6.4	10.4	+	-	+
1931	9.7	06.3	+	-	-
1932	8.2	07.4	-	+	-
1933	7.7	11.1	-	+	-
1934	7.2	12.4	-	+	+
1935	5.4	11.8	-	-	-
1936	4.5	12.9	-	+	+
1937	11.5	08.8	+	-	-
1938	13.0	09.0	+	+	-
1939	10.6	10.3	-	+	-
1940	12.2	11.6	+	+	-
1941	10.6	19.2	-	+	-
1942	10.66	21.0	+	+	-
1943	10.74	21.3	+	+	-
1944	11.16	22.6	+	+	-
1945	7.3	26.7	-	+	-
1946	2.5	35.5	-	+	+
1947	3.1	35.4	+	-	+
1948 ^b	5.3	32.9	+	-	+
1949 ^b	6.8	31.8	+	-	

^a New York Cotton Exchange except 1949 price which is average of 10 U. S. markets.

^b Preliminary.

Source: Computed from *Agricultural Statistics*, United States Department of Agriculture, 1936, 1945, 1949, 1950.

the period since 1925, in an average of nine years out of 10 for corn and eight years out of 10 for wheat, the movement of stock holdings has been consistent with price stability.

Column (4) shows the probability of the occurrence by chance of at least the observed number of "correct" years for the short term case on the assumption that the observations are independent between years. Given this assumption, the probabilities may be calculated from the familiar binomial distribution with a probability of .5 of obtaining a "correct" year in a single observation. For the three products, we may infer that the results shown for the short term case did not occur by chance.

On the other hand, for the long term case there is no significant proba-

bility against the occurrence by chance of the observed number of "correct" years for any of the products. Thus, we have substantiated what few would doubt: that expectations with regard to the immediate future are more liable to prove correct than expectations which refer to a more distant time.

The same conclusion holds for the subset of years when the short term and long term cases conflict. During these periods, which correspond to the first four combinations in Chart 1, the direction of price and stocks movements is such that each observation is "correct" from only one stand-

TABLE 4. SUMMARY OF FINDINGS

Product	Total Number of Observations	Number of "Correct" Observations. Short Term Case	Probability of Occurrence by Chance. Short Term Case	Number of "Correct" Observations. Long Term Case
(1)	(2)	(3)	(4)	(5)
Corn	21	19	.0001	11
Wheat	28	22	.0019	10
Cotton	30*	23	.0026	15

* Twenty-nine observations for the long term case.

point. For all commodities the short term performance in this subset is not significantly different from that shown in Table 4 for all observations; i.e., short term considerations are paramount.

Turning now from speculation as a whole over the period of three decades, let us consider a distinction between private and governmental speculation. For a number of years since 1933 the inventory transactions of the Commodity Credit Corporation have made the government a major speculator in certain commodity markets. Also, and perhaps more important, the loan program operations of the Commodity Credit Corporation may have created a change in the speculative environment, for having entered into a loan agreement the producer is protected against a downward price movement. Commodity Credit Corporation price support operations have covered corn and cotton since 1933 and wheat since 1938.

For brevity, the period since 1933 (1938 in the case of wheat) has been designated as years of governmental speculation and the prior period as years of private speculation. We shall find that, as regards the "correctness" of speculation, there is no significant difference between the period when governmental speculation and other commodity support programs existed and the years when speculation was purely a private function.

Total observations and the number of correct observations for each commodity for both periods are given in Table 5.

Although the "true" probability of obtaining a "correct" observation is

TABLE 5. COMPARISON OF PERIODS OF PRIVATE AND GOVERNMENTAL SPECULATION

Commodity	Short Term Case		Long Term Case	
	Total Observations	Correct Observations	Total Observations	Correct Observations
(1)	(2)	(3)	(4)	(5)
Wheat:				
Private Speculation (1920-37)	18	15	17	7
Governmental Speculation (1938-48)	10	7	11	3
Corn:				
Private Speculation (1926-32)	7	6	6	2
Governmental Speculation (1933-48)	14	13	15	9
Cotton:				
Private Speculation (1920-32)	13	12	12	6
Governmental Speculation (1933-48)	17	11	17	9

not known (it was shown above that the probability is not .5), a comparison between the two periods may be made by testing the two percentages of successes to determine if the difference in the percentages could have occurred by chance.⁵ The smallest probability of the six cases in Table 5 (three short term and three long term) occurs for cotton in the short term case. The computed probability is .09 that 11 "correct" years out of 17 observations does not differ from 12 "correct" years out of 13 observations. Since .09 is greater than the usual confidence limit of .05, there is no basis for concluding that the effectiveness of speculation differed during the two periods.

Conclusions

Mention should be made of several qualifications. In some years it is likely that end-of-year stocks are not truly representative of stock movements for the year as a whole. This is especially possible where the change in holdings has been small. A more general analysis might be contrived by integrating the magnitude of changes in prices and stocks with the nature of changes in outside demand and supply conditions. One would also suspect that the time length of expectations is related to the latter elements. It should be re-emphasized that no account is taken here of intra-year speculation; the validity of the results rests upon annual data. The inferences of Kaldor, Schultz, and like-minded critics may well be an accurate description of short run events. It is believed, however, that the quantitative findings presented above uphold the traditional view that speculative activity is, in the long run, conducted in a manner which reduces price fluctuations.

⁵ In more exact language we are testing the homogeneity of a pair of dichotomies. See: Eisenhart, Hastay and Wallis (Editors), *Techniques of Statistical Analysis*, McGraw-Hill Book Co., Inc., New York, 1947, Ch. 7, p. 249.

THE SOVIET DAIRY INDUSTRY

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THE Soviet dairy industry receives its milk through five main channels. These are the state dairy farms, the collective farms having dairy enterprises (MTF), the individual members of the collective farms who have milking animals, the independent peasants with cows, and various state-owned purchasing organizations which contract numerous producers of milk delivery. In addition, there are a large number of consumer cooperative associations which produce milk and other dairy products for their own use.

More than half of the Soviet commercial milk requirements are supplied by collective farms, their members, and independent peasants. The peasantry provides milk for the local markets and individual buyers. State dairy farms, being government-owned and operated, deliver to the state all their milk not utilized on the farms.

SOURCES OF FLUID MILK IN 1939:¹

	<i>Tons in Thousands</i>
Collective Farms	2,290.1
Purchasing Organizations	1,050.0
Members of Collective Farms and Independent Peasants	1,040.7
State Farms	1,011.8
Total	5,392.6

In order to process this tremendous volume of fluid milk, the Soviets devised a series of channels through which the milk flows to the processing plants.

The process begins with the milking of the cows on the collective farms. The milk is then delivered to a cooler located on each farm. The cooler strains the milk, and puts it into cans which are placed on ice. When a sufficient amount of milk is collected, it is transported in cans to one of the country receiving stations, located at strategic points convenient to several collective farms.

At the receiving station, the milk is strained again, replaced in containers, and placed on ice. When a given volume is collected, the station fills a large milk tank and delivers it either to the city milk plant or processing plant. Due to a shortage of milk tanks, the milk is often delivered in cans by trucks or horses.

In 1939 the Soviets had 93 city milk plants located in 97 cities, towns, and industrial settlements. This indicates that a single milk plant was used to supply several communities, with the size of these plants varying

¹ *Molochnaia Promyshlennost* S.S.S.R., Nos. 2-3, 1940, p. 2.

according to the size of the urban population. The most frequent capacities are: (1) 15 tons of fluid milk and two tons of ice cream; (2) 25 tons of fluid milk and six tons of ice cream; and (3) 50 tons of fluid milk and 10 tons of ice cream per day.²

Because of a shortage of milk plant equipment, several of these plants have double shifts. This scarcity also was responsible for the fact that only 75.5 per cent of the total fluid milk distributed in the urban concentrations in 1939 was pasteurized.³ For the country as a whole, the percentage of milk which escaped state inspection and pasteurization was no doubt even greater.

The bulk of fluid milk received by the milk plants is distributed in large containers to various institutional users. Available data on bottled milk show that in 1939 the Soviets bottled only 128,000 tons or approximately 2.4 per cent of the total fluid milk received.⁴

But the distribution of fluid milk is only one phase of the giant Soviet milk system. Another important phase of activities is concerned with the production of several dairy products.

In 1937, the Soviet Union had 44 different dairy products on the market, the volume of which was estimated at 419,000 tons.⁵ But in 1939, plans were laid to increase this volume to 1,160,000 tons.⁶ Thus it may be assumed that there was a rapid expansion between 1937 and 1939, not only in collection of fluid milk, but also in processing it into various dairy products.

Major Divisions of Dairy Industry

All Soviet milk plants are administered by the Main Milk Administration ("Glavmoloka"). The Soviet dairy industry may be divided roughly into three separate functions—milk plants, creameries and cheese factories, and condenseries and powdered milk plants. Milk plants as a rule do not manufacture butter or cheese. Creameries and cheese factories specialize in their own limited fields, although there are a number of small cheese factories in Siberia which process butter for local markets. Condenseries and powdered milk plants are strictly one-product enterprises.

The 1938 plan called for an increase of 350 per cent over the 1933 output of dairy products by "Glavmoloka." Pasteurized milk was to be increased many fold and a new product was to be introduced—Soviet chocolate milk. The percentage of raw milk in the total milk supply was to be decreased from 39.6 per cent in 1933 to 16.5 per cent in 1938.

² *Molochno-Maslodelnaia Promyshlennost S.S.S.R.*, No. 4, 1939, p. 13.

³ *Molochnaia Promyshlennost S.S.S.R.*, Nos. 2-3, 1940, p. 10.

⁴ *Ibid.*

⁵ *Bolshaia Sovetskaya Encyclopediya*, Vol. 39, 1939, p. 732.

⁶ *Molochno-Maslodelnata Promyshlennost S.S.S.R.*, No. 1, 1937, pp. 2-5.

OUTPUT OF DAIRY PRODUCTS BY "GLAVMOLOKA" IN TONS⁷

Product	1933 (actual)	1938 (plan)
Raw Milk in Cans	48,928	73,270
Pasteurized Milk in Cans	51,150	196,640
Pasteurized Milk in Bottles (Quarts)	14,347	127,300
Cream	926	2,940
Kefier in .5 Liter Bottles	5,427	16,765
Clotted Milk in .8 Liter Cans	2,568	10,888
Chocolate Milk in .5 Liter Bottles	—	2,634
Ice Cream	164	13,500
Total	123,510	443,937

In 1939, the Soviets had eight condenseries and two powdered milk plants in addition to those of "Glavmoloka." Four additional powdered milk plants were to be in operation by 1940, indicating that the output of powdered milk was to be increased at an even greater rate than that of milk for retail consumption.

In 1939, Soviet condenseries produced 55.6 million of 400-gram cans of condensed milk. This was an increase of 17.5 per cent over the 1938 output. Production of powdered milk increased 30 per cent from 1938 to 1939.⁸

Seek Year-round Ice Cream Production

In 1938, "Glavmoloka" planned to produce 13,500 tons of ice cream. Although this administration is the major producer of commercial ice cream, other state agencies manufacture it too. The total commercially manufactured ice cream in 1938 was 15,099 tons and a year later it was 21,281 tons,⁹ which represents about 30 per cent of the total ice cream consumed by the Russians. The other 70 per cent is a home-made product. For example, in 1938 it was expected that a total volume of ice cream consumed in the Soviet Union would be 46,800 tons.¹⁰

The most popular flavors are vanilla, strawberry, cherry and apricot ice cream, followed by sherbets and ices. Of great concern to Soviet authorities, however, was the seasonal production of commercial ice cream. It was pointed out to the ice cream industry that the 1937 one-to-eight winter-to-summer production ratio must be more balanced and that the ice cream industry must be put on a year-round production schedule.

The retail distribution of ice cream in large urban concentrations such as Moscow is not different from other European cities. Ice cream is sold

⁷ *Ibid.*, No. 2, 1938, p. 7.

⁸ *Molochno-Maslovelnaia Promyshlennost S.S.S.R.*, No. 10, 1939, pp. 5-6; and *Molochnaia Promyshlennost S.S.S.R.*, Nos 2-3, 1940, p. 12.

⁹ *Molochnaia Promyshlennost S.S.S.R.*, Nos. 2-3, 1940, p. 11.

¹⁰ *Molochno-Miasnala Promyshlennost S.S.S.R.*, No. 3, 1939, p. 5.

through restaurants, soft drink "kiosks," and dairy counters and stands established throughout the cities. In the spring and summer, the Soviet "Good Humor Man" pushes his white cart on the streets and parks and sells ice cream cones, bricks, and even "Eskimo Pies." During official "rest days" and Soviet holidays, licensed vendors, mostly girls in white coats, sell their ice cream products from small baskets thrown over their arms.

Butter Industry Had Slow Start in 1931

The Soviet butter industry had a slow start in 1931. The number of creameries and cheese factories in 1926 was 700 and 10 years later it was 1,013. Soviet creameries produced 186,800 tons of butter in 1939 and 207,000 tons in 1940.¹¹ Data on home-made butter, which too finds its way to retail markets, is not available. It is reasonable, however, to believe that, as in the case of home-made ice cream, production of home-made butter comprises the better half of total Soviet butter consumption.

It is interesting to note that in 1939 Western Siberia produced 28.1 per cent of the total Soviet commercially produced butter. Ukraine produced 15.2 per cent, followed by the Ural region which manufactured 5.7 per cent, and the North European region only 5.5 per cent. This means that the Asiatic republic, central European regions and White Russian republic produce approximately one half of the Soviet factory-made butter.¹²

In 1937, about three-fourths of the factory-made butter was salted, but the plan for 1942 called for 35 per cent of the total to be sweet butter. The percentage of home-made sweet butter was somewhat higher than for factory-made because in general the Russians prefer sweet to salted butter.

Expansion of the Soviet cheese industry was not as spectacular as for other dairy products, although the industry has experienced more or less uniform growth, especially since 1936. This may be explained by the lack of popular demand and high cheese prices. Nevertheless, in 1939 the Soviets produced 33,200 tons of all cheeses, and by 1940 this had increased to 37,090 tons.¹³

The Soviet production of domestic brand cheeses may be divided into two specialized fields, the large and small cheeses. In Russia, large sized cheeses of domestic brands represent "high" and "extra" qualities, whereas small sized cheeses are usually of inferior quality. Historically, small sized

¹¹ *Molochnaia Promyshlennost S.S.S.R.*, Nos. 2-3, 1940, p. 4; and *Sovietskaya Torgovlia Za 30 Let*, Moscow, 1947, p. 67.

¹² *Molochnaia Promyshlennost S.S.S.R.*, Nos. 2-3, 1940, p. 5.

¹³ *Ibid.*, p. 6.

domestic brands were manufactured largely on the farms by peasants who ignored or neglected sanitation precautions and aging processes.

In 1936, however, small sized cheese of foreign brands appeared on the market, though the prices were so high that they were out of the reach of the masses. Among various foreign brands were: Roquefort, Limburger, Camembert, Gorgonzola, and Muenster. In 1939, over 50 different brands were manufactured and the plan for 1940 called for an increase to 60-70 brands. This expansion was to be achieved through construction of 40 new small cheese factories, each of which would have an annual consumption of milk ranging from 500 to 1,000 tons.

World War II Upset Dairy Economy

The year 1939 was the last of normal activity for the Soviet dairy industry. Occupation of the Baltic regions in 1940 brought an unexpected increase, and the outbreak of war in 1941 upset the whole economy. And it must be kept in mind that all progress made by Soviet dairy industry in 1939 was done under direct leadership of Anastas Mikoyan, Politburo member and head of the Ministry of Food Industries.

Mikoyan was one of the few Politburo members who was much impressed by Western technology and production records. It was he who by threats, commands, and various persuasions encouraged the expansion of ice cream and cheese production. Under his iron-handed administration, many incompetent managers were banished from the posts and over-all efficiency improved. And it was expected that by the end of the Third Five-Year Plan in 1942, the Soviet dairy industry should be able to further increase its output to satisfy the growing demand.

PLANNED PRODUCTION FOR 1942:¹⁴

<i>Product</i>	<i>Tons</i>
Fluid Milk	8,000,000
All Dairy Manufactured Products:	1,590,000
Butter	270,000
Cheese	45,000
Milk in 400 Gram-Cans (Millions)	140

The 1942 expectations were achieved two years early as a result of events not anticipated when the Third Five-Year Plan was inaugurated in 1938. Although the Soviet dairy industry failed to receive 457,000 tons of fluid milk from the peasants¹⁵ on June 1, 1940, this was more than offset by the occupation of the Baltic States which enlarged the total Soviet production.

Only partial data are available which indicate the volume produced in

¹⁴ *Molochnaia Promyshlennost S.S.S.R.*, Nos. 2-3, 1940, pp. 6, 14; and Nos. 10-11, 1940, p. 3.

¹⁵ *Ibid.*, No. 5, 1940, p. 1.

the Baltic States. But even this information suggests a considerable addition to the total Soviet dairy production. In 1938, Latvia and Estonia manufactured about 33,000 tons of butter and Lithuania produced 553,300 tons of milk.¹⁰ Assuming that these three republics in 1940 produced the same volume of dairy products as in 1938, it was indeed a tremendous boost to the Soviet's lagging production. In fact, the plan for 1942 called for the collection of eight million tons of milk. After the occupation of the Baltic States in 1940, this volume increased to 10.3 million tons and was expected to be 35.9 million tons in 1941.¹⁷

World War II brought about wholesale destruction to Soviet dairy animals, plants, facilities, and equipment. The Soviets claim that because of the war, the U.S.S.R. in effect lost 56.7 million tons of fluid milk which otherwise would have been produced.¹⁸ The war was a double-edged sword, cutting into the industry two ways. On one hand, the Germans, in the matter of a few months after the attack, occupied an area containing approximately 50 per cent of the Soviet dairy industry. On the other hand, because of the war conditions, the unoccupied regions not only decreased their productive stock, but were forced to cut their efficiency. This may be seen from the fact that the average annual yield per milking animal was decreased from 1,100 kilograms in 1938 to 945 kilograms in 1945.¹⁹ Only after the successful counter-attack by the Red Army in 1944 did the Soviet system begin to recover. The Soviet press estimated that the 1944 milk collection was 21 per cent higher than in 1943 and the 1945 collection 37 per cent more than in 1944.²⁰ But these increases came not through increased efficiency of the existing dairies but because of liberation of the occupied regions where the Germans failed to destroy the animals before retreating.

A year after the war ended, the Soviets announced their famous Five-Year Plan (1946-1950). Among other things, this plan called for rehabilitation and completion of 22 destroyed and damaged milk plants and eight condenseries; the building of 48 new milk plants, 13 new condensaries and 1,200 new creameries and cheese factories.²¹ In 1946 it was anticipated that upon completion of this plan, the Soviets would be producing some dairy products in abundance beyond the 1939-1940 volume.

¹⁰ *Ibid.*, No. 8, 1940, p. 3.

¹⁷ *Socialisticheskoe Selskoe Khozaistvo*, January, 1942, p. 6; *Gosudarstvennyi Plan Razvitiia Narodnago Khozaistva S.S.S.R. na 1941 God*, Moscow, 1941, p. 73.

¹⁸ N. A. Voznesenski, *Voennaiia Ekonomia S.S.S.R. v Period Otechestvennoi Volny*, Moscow, 1948, p. 162.

¹⁹ *Socialisticheskoe Selskoe Khozaistvo*, February, 1940, p. 6; *Izvestia*, March 7, 1947.

²⁰ *Planovoe Khozaistvo*, No. 4, 1945, p. 27.

²¹ D. D. Barkzevich, *Tovarovedenie Pischevykh Productov*, Moscow, 1948, p. 98.

EXPECTED PRODUCTION IN 1950:²²

Product	Tons
Fluid Milk	8,900,000
Butter	284,100
Cheese	50,000
Other Manufactured Dairy Products	200,000
Average Annual Yield Per Cow (Kilograms)	1,578

A comparison of the 1940 milk collection with that planned for 1950 reveals that the planned output was below that of a decade ago. But butter and cheese were to be increased over the 1939-1940 level through rehabilitation of well-developed creameries and cheese factories in the Baltic States. The plan does not give a goal for ice cream production. It is reasonable to believe, therefore, that efforts during 1946-1950 were to be made not on varieties and fancy items such as ice cream and chocolate milk, but on the volume of a few items requiring the least expenditure of scarce resources. Under conditions existing in 1945, it seemed logical that some of the milk, which under normal conditions would have been allocated to production of ice cream, was shifted to butter.

Butter Industry Made Rapid Post-war Recovery

The most reliable statistics since the end of the war are those on butter, and these definitely show that the progress of recovery of the butter industry was remarkable. Numerous Soviet sources indicate that the 1946 plan for butter was 160 per cent of the goal established for that year. The plan for 1947 was set at 185,000 tons but the actual output was 207,200 tons. In 1948, production was 275,310 tons, or 137 per cent over 1947. In 1949, the butter output was six per cent over the planned volume. All this suggests that even though the above data may be somewhat inflated, there should be no doubt that the butter industry as a whole recovered much more rapidly than other dairy enterprises.

It is interesting to note that World War II did not change the base of butter production as it did in other products, such as grain. The main source of butter production was, and still is, the Volga River Valley regions. What is interesting is the fact that, after the war, the Baltic States were expected to manufacture about the same volume of butter as in the pre-war period, suggesting that the destruction of creameries in these regions was not as considerable as in the other parts of the U.S.S.R.

The cheese industry was slow in recovering from the damage of the war. Many cheese factories were destroyed, there was a dislocation of trained personnel, efficiency was low, and the industry failed time after time to meet the established quota. In 1949, The Soviet press gave much of its space to a stimulation of enthusiasm among cheese makers; but like

²² *Ibid.*; *Pravda*, May 26, 1949; *Planovoe Khozaistvo*, No. 2, 1946, pp. 11, 36-39.

the fluid milk industry, the cheese industry failed to produce the expected volume. The backlog seemed due to the inability of the fluid milk industry to allocate the needed raw materials for cheese manufacture. The emphasis during the rehabilitation period was, and still is, on a few items requiring the least efforts. Only well-known cheeses were produced, and in 1949 about 100 tons of Swiss cheese, well-known to the masses, was manufactured.

According to the Soviet press, the production of the fluid milk industry in 1949 was about the same as in 1948. But in 1948 the western parts of the U.S.S.R. experienced a severe drought and many productive animals either died of starvation or were killed by the peasants. In 1949, with more livestock feed available, it was natural that the production should have been improved. This improvement was boosted through encouragement from the government, which in 1949 allocated an additional 2,000 trucks, a considerable amount of material and equipment, milk containers, and separators. The 1949 budget for the whole dairy industry was 200 million rubles. This suggests that among other things, transportation facilities, destroyed or broken down during and after the war, were responsible for the failure to deliver required raw material to processing plants. However, an additional allocation of scarce resources in 1949 was too late to help the industry reach the 1950 goal, and the Soviets devised another plan.

New Plan Called for Huge Building Program

This new plan was to be effective during 1949-1951 and was an addition to the original 1946-1950 plan. This plan called for the construction of 2,000 new creameries and cheese factories, 15 new condenseries, 400 new powdered milk plants, 6,000 new separators, 300 country receiving stations with coolers, and 600 cheese warehouses.²³ No doubt the new plan was necessary to improve lagging production of the industry. By expanding the facilities, the Soviets expected not only to increase the production, but to enlarge the variety of dairy products available on the market in 1939-1940.

This may be reached in a few years after the construction of the additional facilities, but meanwhile whatever increase in dairy production may have occurred in 1950-1951 was distributed among a larger population, estimated at 224 millions in 1950.²⁴ According to the Five-Year Plan and the supplementary plan of 1949-1951, the collection of fluid milk in 1951 was expected to be approximately the same as in 1940, thus per capita

²³ *Molochnaia Promyshlennost S.S.S.R.*, No. 3, 1950, p. 7.

²⁴ V. Katkoff, *Soviet Grain Production: 1940-1950*, *Land Economics*, August, 1950, p. 220.

consumption in 1950 was about 16 per cent below pre-war level. Using the 1940 base, 1950 production was to be increased 33 per cent for butter, and 35 per cent for cheese. If these expectations were achieved, the Russians should have had about the same per capita consumption of butter and cheese in 1951 as in 1939-1940.

The planned production for ice cream and condensed milk is not available, but it seems reasonable to assume that output of these items in 1951 should be somewhat below the 1939-1940 level. This may be explained by the fact that at present the Soviets stress production of a few items requiring simplest equipment and the least storage space. Above all, the Soviets are now encouraging production of the less bulky powdered milk.

In general, it should be a remarkable achievement if the Soviet dairy industry as a whole could reach the level of production set for 1951 as was planned for 1942 under the Third Five-Year Plan (1938-1942). But this is doubtful. The best the industry could hope to achieve in 1951 was production equal to that of 1940, but even then the per capita consumption will be somewhat below that of 1940.

NOTES

AT WHAT GRADE DOES IT PAY TO SELL POTATOES?

FOR many years, potato farmers have been urged by marketing technicians in academic and trade institutions to grade and improve the quality of their products. Several agricultural colleges have adopted quality improvement programs involving specialists in the field of production, marketing, processing, and engineering—all working toward the objective of providing the market with better quality potatoes. It seemed apparent to many people that if farmers would sell only their best grades, they would not only make more money but would increase the market for their product. Many growers have repeatedly disagreed with the assumption that it does pay to leave the poorer quality at home where they will bring little or no return. Other growers contend that they make more money by selling the entire crop rather than that share which is of top quality.

Monetary Benefits Not Emphasized

A great deal of emphasis continues to be placed on quality programs and probably the tempo will be increased in the future. However, unless potato growers are equipped with facts, it seems quite safe to assume that many growers will only take a passive interest in the economics of grading problems. The apathy of some growers toward grading programs probably stems from the fact that the monetary benefits have not been emphasized.

In order to stimulate active interest on the part of farmers in the economics of grading, agricultural marketing specialists should point out the relationship between market prices and cost factors.

The statement, "does it pay to grade," is loosely used and often misleading. A more appropriate interpretation may be, "at what grade classifications should growers sell their crop to make the most money?" Potato growers can sell their crops according to several grades as established by the United States Department of Agriculture. These grades include quality ranging from the best to poorest. It might be assumed that these grades, such as U. S. Fancy, U. S. Extra No. 1, U. S. No. 1, U. S. Commercial, U. S. No. 2, have been designed to channel quality into the different demands that exist in the wholesale market. An investigation of any of the Federal-State market reports for potatoes would indicate that the market will pay different prices for different qualities (Table 1).

From Table 1, we find a difference in prices exists for potatoes (1) on a variety basis, (2) on the grade basis, and (3) in merchandising practices.

TABLE 1. WHOLESALE POTATO PRICES—SEPTEMBER 12, 1951
CHICAGO MARKET

	Russet Burbanks				Pontiac	Chippewa:	
	U.S. No. 1 Size A Washed	U.S. No. 2 Washed	40 Per Cent 10 oz. U.S. No. 1	Stand- ards	U.S. No. 1 Size A Washed	U.S. Com- mercial Un- washed	U.S. No. 1
Idaho-Oregon	4.85- 4.90		5.00	4.25			
Washington	4.80- 4.90	3.85- 4.00			3.00- 3.25		
Wisconsin	4.00					1.80- 1.85	
Minn.-N.D.				2.75			
Wisconsin Points						1.55	1.70

It should be noted the information in Table 1 indicates the price relationships that exist on that day. However, for the purpose of this article, the information presented indicates the extent of grade pricing differentials.

Growers must consider three factors when deciding which grades to use in selling their potatoes. These factors are price differential between grades, controlling tolerances, and cost of grading.

TABLE 2. COMPARISON OF TOLERANCES BETWEEN U. S.
No. 1 AND U. S. COMMERCIAL GRADES

Tolerance	Grade	
	U. S. No. 1	U. S. Commercial
Size	5 per cent under 1½"	5 per cent under 1½"
Grade Defects	6 per cent	20 per cent
Hollow-heart	5 per cent damage	5 per cent serious damage
Wet Breakdown	1 per cent	1 per cent
Dirt	None*	Free from serious damage
Sprouts	None*	10 per cent
Additional	—	6 per cent below U. S. No. 2

* Included under grade defects.

In Tables 1 and 3, one will note the existence of price differentials between grades. In Table 2, a tabulation was made of permissible tolerances in U. S. No. 1 and U. S. Commercial federal grades. Later in Table 4, information will be presented to show how price differentials between grades and tolerance, as found in grade defects, can assist growers in determining the grades to use in marketing their crop.

TABLE 3. WHOLESALE PRICES OF POTATOES, PER HUNDRED WEIGHT, ROUND WHITE VARIETIES, BY GRADES, WISCONSIN, SHIPPING POINTS, 1949 AND 1950

Months	1950			1949		
	U. S. No. 1	U. S. Com- mercial	Dif- ference	U. S. No. 1	U. S. Com- mercial	Dif- ference
	Dollars					
January	2.10	1.99	.11	2.59	2.45	.14
February	1.99	1.84	.15	2.70	2.59	.11
March				2.78	2.68	.10
September				1.95	1.81	.14
October				1.89	1.70	.19
November	1.25	1.07	.18	2.04	1.91	.13
December	1.32	1.19	.13	2.08	1.98	.10

* Source: U. S. Production and Marketing Administration, Fruit and Vegetable Branch, Washington, D. C.

Tolerances Are Compared

Now it is necessary to explain what is meant by "controlling tolerances between grades and standards." It will be noted that in Table 2 certain tolerances are provided for in U. S. No. 1 and U. S. Commercial grades; specific tolerances exists between U. S. Fancy and U. S. Extra No. 1 or between any other combination of potato grades.

When tolerances such as dirt, sprouts, and "additional" tolerance as indicated in Table 2 are excluded, the major distinction between U. S. No. 1 and U. S. Commercial grade is found in the category of "grade defect" tolerances. The U. S. No. 1 "grade defect" tolerance is six per cent as compared to 20 per cent in the U. S. Commercial grade. In selling potatoes on the wholesale market, a common practice is to indicate the percentage of U. S. No. 1 quality found in the U. S. Commercial grade, such as: U. S. Commercial—88 per cent of U. S. No. 1 quality. The term controlling tolerances in this article means tolerances as found in the category of "grade defects."

Table 3 shows wholesale prices, by grades, received by farmers at various Wisconsin shipping points. It will be noted that a grade price differential exists between U. S. No. 1 and U. S. Commercial. In 1950, the grade price differential ranged from 11 cents to 18 cents, and for the same period in 1949 from 10 cents to 19 cents.

Farmers want to know: Should they sell their entire crop at the U. S. No. 1 grade; or (2) sell a certain portion at U. S. No. 1 and the remainder at U. S. Commercial; or (3) sell the entire crop at U. S. Commercial grade?

A technique has been developed in Table 4 to help farmers decide whether to sell their crops at U. S. No. 1 or U. S. Commercial grade. A similar table can be developed for any combination of U. S. grades.

TABLE 4. QUANTITIES AND VALUE OF POTATOES RELATED TO FIELD RUN PERCENTAGES OF GRADE DEFECTS

Field-Run Per Cent Defects	Pounds of Defects to Be Removed to Get 94 Per Cent U. S. No. 1 Quality	Total Pounds Remaining of Perfect 94 Per Cent U. S. No. 1 Quality	Recovery Value of Pounds of Defects Removed ^b (Cents)	U. S. No. 1 Value at \$1.99
6	0.00	100.00	0.00	1.99
7	1.07	98.93 ^a	0.74	1.96
8	2.13	97.87	1.50	1.95
9	3.20	96.80	2.25	1.93
10	4.26	95.74	2.99	1.90
11	5.32	94.68	3.73	1.88
12	6.39	93.61	4.48	1.86
13	7.45	92.55	5.22	1.84
14	8.52	91.48	5.97	1.82
15	9.58	90.42	6.71	1.80
16	10.64	89.36	7.45	1.78
17	11.71	88.29	8.20	1.76
18	12.77	87.23	8.95	1.74
19	13.83	86.17	9.67	1.71
20	14.89	85.11	10.43	1.69

^a $100 - 7 = 93 \div 94 = 98.93$.

^b Defects sold for feed based on 100 pounds of potatoes in feed value are worth about 25 per cent as much as 100 pounds of grain—January 1952 Wisconsin corn price 2.9 cents shelled basis per pound $-1.07 \times .7$ cents = .74 cents. In producing areas near city markets, the recovery value of low quality might have a higher value than shown here since these potatoes would be sold for human consumption and not animal feed.

Illustration I

U. S. Commercial price per 100 pounds \$1.84
 U. S. No. 1 price per 100 pounds 1.99

Field-run of 13 per cent grade defects

Pounds of U. S. No. 1 that can be sold by controlling defects = 92.55 pounds.

$$.9255 \times \$1.99 = \$1.84$$

If grading cost equalled recovery value of 7.45 pounds of defects removed, from the growers standpoint, it did not matter at which grade he marketed his crop. However, the farmer in this case should sell his crop at the higher grade level.

Illustration II

U. S. Commercial \$1.84
 U. S. No. 1 1.99

Field-run of eight per cent grade defects.

Pounds of U. S. No. 1 that can be sold by controlling defects = 97.87 pounds.

$$.9787 \times \$1.99 = \$1.95$$

It is probably reasonable to assume that grading cost would be lower than the recovery value 1.5 cents. In this illustration, it would pay farmers to sell their crops at U. S. No. 1 grade (94 per cent U. S. No. 1 quality)

instead of U. S. Commercial (92 per cent U. S. No. 1 quality) because they would gain 11 cents in addition to the difference between grading cost and recovery value.

Illustration III

U. S. Commercial	\$1.84
U. S. No. 1	1.99

Field-run of 18 per cent grade defects

Pounds of U. S. No. 1 that can be sold by controlling defects = 87.23 pounds.

$$.8723 \times \$1.99 = \$1.74$$

It is probably reasonable to assume that grading cost might be higher than recovery value at this level. Even if grading cost and recovery value were equal, it would not pay the farmer to sell his crop at U. S. No. 1 instead of U. S. Commercial. Furthermore, if there was no price differential between 86 per cent U.S. No. 1 and 80 per cent U. S. No. 1 quality, it might be profitable for the grower to take out some of the U. S. No. 1 quality and sell his crop lots at the maximum tolerance allowable in the U. S. Commercial grade.

Conclusions

Application of these techniques should assist growers in their day-to-day operations. In order to fully utilize the principles of controlling tolerance between grades, farmers would have to determine the proportion of potatoes that would make the various grades.

The major observation that can be made from these illustrations is that a tolerance breaking point exists between the grades which should help farmers determine the grades they should use in selling their crops. In addition to the tolerance breaking point, based on price differentials between grades, it would also be necessary for the farmer to include cost of grading in determining the grades at which he would sell his crop. In order to maximize his net returns, a grower frequently would have to adjust and change his marketing policy because market price relationships and grade price differentials change even on a weekly basis.

There are some other considerations which must be taken into account by growers when deciding at which grades they should sell their crops. These are: (1) establishing market preference for their commodity through dependable brands, (2) availability of market outlets, and (3) gearing their farm operations to producing high quality crops at low unit cost.

To summarize, the practical problem is to sell potato crops at grade levels which will make the farmer the most money. Farmers, when considering price differentials between grades, controlling of tolerances, and cost of grading, can determine "at what grade does it pay to sell potatoes."

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FORECASTING ANNUAL CATTLE SLAUGHTER

WORKERS in the field of livestock economics always have had less success with analyses applied to beef cattle than with those for other species. Published analyses of cattle prices are few. Most formal historical cattle analyses have only modest accuracy by the conventional tests. Moreover, when used for forecasting purposes, the most exacting of all tests, analyses on beef cattle have proved less reliable than those for hogs, milk cows, poultry, and even sheep and lambs.

Forecasting of production, consumption, and price for farm commodities has long been carried on by state colleges and Experiment Stations and the United States Department of Agriculture. It has served as a background for the "Economic Outlook" work of the Federal and State Extension Service. It also has risen to importance as a basis for policy determination by both governmental and private agencies. Economic forecasting ranks as one of the primary applications of economic theory and statistical techniques.

In the forecasting of livestock activities, the estimate that is most basic is that of the size of slaughter. The slaughter estimate is used to develop estimates of price, consumption and other values. If the slaughter estimate is approximately correct, the derived forecasts also have a good chance of being accurate. An error in the forecast of slaughter virtually dooms all other forecasts to considerable error.

The experience of the Bureau of Agricultural Economics in its projections for 1951 illustrates the special hazards in forecasts about beef cattle. Estimates of hog slaughter for 1951, made in December, 1950, were in error by only 1.3 million head, or 1.5 per cent, as judged from preliminary 1951 totals available in early February, 1952. Forecasts of sheep and lamb slaughter proved wrong by 1.2 million head, or 10 per cent. But slaughter of cattle and calves, predicted at 30.2 million head, turned out to be only 26 million. The error amounted to 14 per cent. Largely because of the poor results in the cattle-slaughter forecast, estimates of meat production and consumption also proved to be less accurate than is desirable. Consumption of all red meat per person for 1951 was predicted in the fall of 1950 at 148 pounds. It was only 138 pounds.

The hog slaughter forecast for 1951 was a little more accurate than usual. The error in cattle slaughter and total meat consumption was greater than in several previous years and, it is hoped, greater than is likely in the forecasts for 1952 and subsequent years.

Reasons for Poorer 1951 Forecasts

Several developments contributed to the faulty 1951 cattle slaughter forecast, notably the imposition of price controls on cattle and beef. The controls accentuated a trend toward expanding numbers of cattle on farms previously set in progress by favorable prices and good feed conditions in most regions. About three-fourths as many cattle and calves were slaughtered as were produced. This degree of withholding

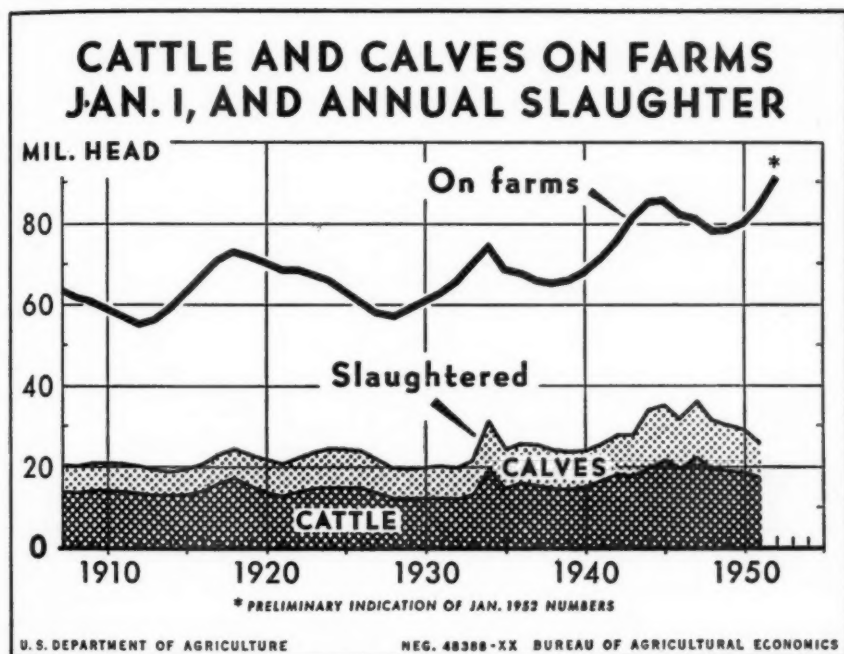


FIG. 1

from slaughter to increase numbers on farms was greater than anticipated. But regardless of the unusual degree of error in the slaughter forecast, the record serves as an example of the particular difficulties in forecasting trends in cattle.

There are good reasons for the special problem in cattle forecasting. The comparatively long life span of cattle, the variety of dispositions that can be made of each animal as it is raised, and the heterogeneity of the United States cattle industry all contribute to less regularity in production and marketing than exists for other species. Another cause for inaccurate forecasting with cattle may be that the forecasting methods used by economists have been less ingenious. Past experience ought to be a challenge to produce more effective analytical and forecasting tools.

Most procedures now used for cattle forecasting rely on the pattern of events associated with the traditional "cattle cycle."¹ Since 1880, numbers of cattle and calves on farms have moved through five up- and down-swings. Numbers slaughtered also have shown a cyclical pattern, although the cycles in slaughter are not as smooth and well-defined as those in numbers (Figure 1). There is much correspondence between the two cyclical patterns. Annual slaughter usually is small when numbers on farms are beginning their upswing, and it remains small for two

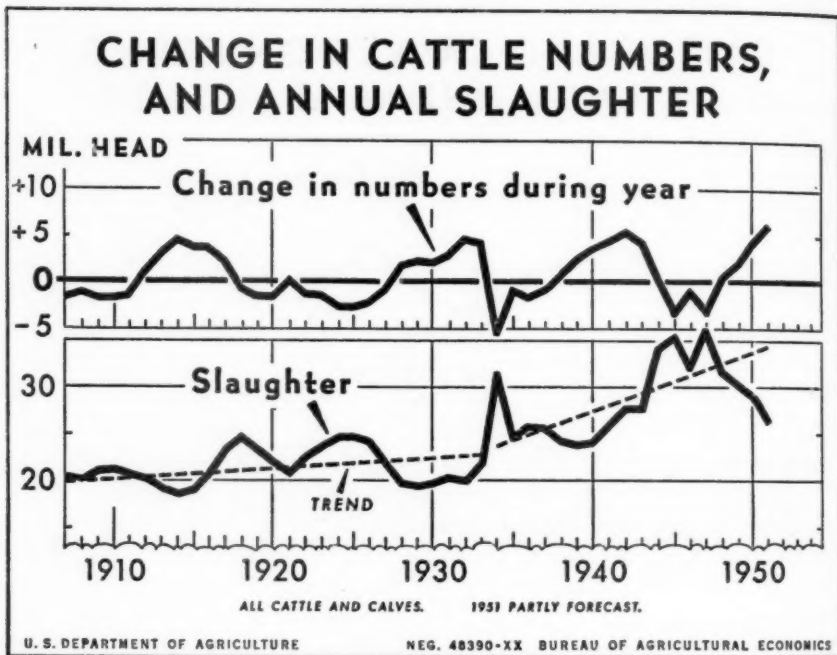


FIG. 2

or three years. Then it starts to increase. Typically, slaughter reaches a peak in the year when numbers first turn down from their high point, and hits a second peak at the time of fastest liquidation of numbers. Peaks of this sort appeared in 1918 and 1924-25; 1934 and 1936-37; and 1945 and 1947.²

The relationships between cycles in annual slaughter and numbers on

¹ Cf. James H. Lorie, "Causes of Annual Fluctuations in the Production of Livestock and Livestock Products," *Journal of Business*, University of Chicago, April, 1947, Supplement. Projections of cattle numbers and slaughter to 1955 based solely on the usual cyclical sequence were made in the *Livestock and Meat Situation* for October, 1951, Bureau of Agricultural Economics, U. S. Department of Agriculture, processed.

² Although this has been the approximate form of the cycle historically, it need

farms are best seen when the numbers are converted to the change taking place between one January and the next. The net addition or reduction in numbers each year (Figure 2) varies more irregularly than would be suggested by the smoothly flowing curves on total numbers. The size of addition or reduction is closely associated with the size of annual slaughter in relation to trend (Figure 2). During a period of substantial increase in numbers on farms, slaughter usually is less than its trend line; and successive reductions in numbers tend to coincide with a slaughter larger than trend. However, near the end of a prolonged period of increase in numbers, slaughter rises to or above its trend value because of the effect of the larger breeding herds and calf crops. Near the end of a prolonged decrease in numbers, slaughter falls back to its trend line.

Trends in slaughter, fitted by free hand, illustrates the faster growth in slaughter since the mid-1930's than before.

A regression of changes in numbers on farms on the departure of slaughter from trend, as shown in Figure 2, gives a b value of $-.76$. The r^2 is $.63$. This indicates that approximately 63 per cent of the short-run variation in slaughter is associated with changes in numbers on farms.

Relation of Time and Numbers

As short-run trends in slaughter are so closely linked to changes in numbers on farms, obviously the level of numbers is not in itself so important an influence on slaughter. This is demonstrated by 1951 alone, when combined cattle and calf slaughter was only 26 million head, one-fourth less than four years earlier. It also was the smallest slaughter in 10 years, even though numbers on farms were close to their record high.

Changes in numbers are prominent in explaining short-run trends in slaughter because they are so large. From 1920 to 1950, the standard deviation of annual changes in cattle numbers on farms amounted to a

not always have identical characteristics. Neither the low points nor the peaks in slaughter need appear at the particular times they have in the past. The peaks in slaughter, for example, are not necessarily bimodal. They are the result of two independent factors—the number of cattle on hand and the rate of liquidation—and they could occur at any of several positions in the downward phase of the numbers cycle.

The author does not regard the cattle cycle as an isolated and automatically self-generated phenomenon, as it is sometimes held to be. Rather, he considers the slowly and smoothly executed trends in cattle as the natural result of the long life span of the species and the reluctance of producers to make decisions drastically changing their inventory of cattle. Both of these factors are conducive to gradualness. However, some element of the "cobweb" theory (over-responsiveness to the high prices at times of small slaughter and to low prices at times of large slaughter) also is admitted as a factor in cycles of cattle numbers.

sizeable 2.8 million head. Or, to measure it differently, the standard deviation of numbers about their 31-year trend (straight-line) was 5.4 million head, which may be compared with the original standard deviation of eight million from the 31-year mean. Thus, despite a fairly pronounced uptrend in numbers from 1920 to 1950, cyclical fluctuations about that trend were so great that only 32 per cent of the original variation about the mean was eliminated by use of a trend line. Sixty-eight per cent remained as deviation from trend.

It is natural that as long as the change in numbers on farms each year is substantial it should be closely associated with annual slaughter. For in the case of a kind of livestock normally retained on farms for longer than one calendar year, there is a virtually perfect inverse relationship between the number retained each year and the number slaughtered. An animal slaughtered is a deduction from the potential number on farms, and an animal withheld from slaughter is an addition to numbers. There is ambiguity as to which is cause and which effect in this relationship. The actual decision of cattlemen is how many cattle they will sell, and the change in numbers they keep on hand is determined thereby. But in a more interpretive sense, the number sold and the number held are but simultaneous results of a single two-way choice. For purposes of analysis it is often useful to treat the change in numbers retained on farms as the causal factor and the number sold for slaughter as the effect. So far as the fundamental intent of cattlemen is to regulate the size of their herds, it is both convenient and reasonable to regard slaughter as the result of their decisions to hold or to sell.

Whereas short-run trends in cattle slaughter are closely related to changes in numbers on farms, longer-run trends are influenced more by the absolute levels of numbers. The longer the time period covered, the less important are changes in numbers, and the more important are their absolute levels, in explaining cattle slaughter. To show comparative relationships over 27 years of record, a multiple correlation analysis was set up in which annual slaughter of cattle and calves was the dependent variable and four factors were chosen as independent variables: X_2 , number of cattle and calves on farms January 1; X_3 , number of cows and heifers two years old and older on farms January 1 as a percentage of total cattle numbers; X_4 , change during each year in number of cattle and calves on farms; X_5 , annual calf crop as a percentage of cow and heifer numbers. Both X_3 and X_5 were converted to ratio form in order to minimize the degree of intercorrelation between the independents.³

During the 27 years, numbers on farms (X_2) alone explained 81 per

³ Credit for all calculations is due Mrs. Lucille Johnson, Bureau of Agricultural Economics.

cent of the variation in slaughter.⁴ Total numbers plus the percentage of cows and heifers (X_3) explained 84 per cent. Annual slaughter is less associated with the change in numbers from one January to the next in a period of this length than it is in the strictly short-run; the change in numbers accounted for 67 per cent of the 16 per cent previously unexplained variation in slaughter.

The four independents taken together accounted for nearly all the variation in slaughter. The R^2 was .99. The equation was $X_1 = -72.89 + .40X_2 + .57X_3 + .97X_4 + .52X_5$.

The above correlation applied to cattle slaughter could be highly reliable for forecasting if values could be known ahead of time for the four independents. The number of cattle and calves on farms (X_2) and the proportion of cows and heifers in the total (X_3) can be anticipated fairly well a little in advance of the year for which a forecast is being made. They are known by mid-February of the forecasted year. The change in numbers during that year cannot be known in advance. The calf crop is not reported until the April following the close of the year to be forecasted.

By breaking the original five-variable equation into four different ones which start with a single independent and successively add an additional variable, a system of successive forecasting equations can be set up. The table below shows the relevant data. The three-variable equation applicable at mid-February is

$$X_1 = -77.34 + .62X_2 + 1.13X_3$$

REGRESSION EQUATIONS FOR SUCCESSIVE FORECASTS OF CATTLE SLAUGHTER USING INCREASING NUMBERS OF VARIABLES AS NEW DATA BECOME KNOWN

Equation Number	Time Basic Data Available	Constant Value a	Net Regression Upon*				Coefficient of Multiple Determination R^2	Standard Error of Estimate, Adjusted S_{E1}	Standard Error as Per Cent of Original Standard Deviation in X_1
			Number All Cattle and Calves Jan. 1 X_2	Per Cent Cows and Heifers Jan. 1 ^b X_3	Change in Number Cattle and Calves During Year X_4	Percentage Calf Crop ^c X_5			
1	Current February ^d	9.87	.51 (.002)	—	—	—	.81	2.19	45
2	Current February	77.34	.62 (.07)	1.13 (.57)	—	—	.84	2.08	43
3	Following February	9.84	.47 (.05)	.31 (.40)	.66 (.10)	—	.95	1.22	25
4	Following April	72.89	.40 (.02)	.57 (.18)	.97 (.05)	.52 (.05)	.99	.49	10

* Standard errors of the net regression coefficients are shown in parentheses.

^b Cows and heifers 2 years old and over as a percentage of total number all cattle and calves.

^c Calves saved as a percentage of cows and heifers 2 years old and over on farms Jan. 1.

^d Advance estimates are made with considerable accuracy late the previous year.

$$^4 r^2_{1,2} = .809060.$$

The R^2 of 84 per cent is statistically significant and high enough to give the equation practical value for forecasting. Yet the standard error of two million head is greater than is desirable. For the reliability needed in forecasting, it is necessary to include an estimate of the change that will take place in numbers on farms—a factor that if anticipated accurately would lift the R^2 to .95 and reduce the standard error to 1.22 million. Despite the aid provided by the historical analyses of the cattle cycle, much yet needs to be done in deciphering the economic factors that govern annual changes in numbers on farms, which have so much bearing on short-run forecasts of slaughter.

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THE ORDER OF PLANNING CROPPING AND LIVESTOCK SYSTEMS

A LARGE number of farm management specialists, especially in extension teaching, advance the proposition that in planning a farm business for long-time optimum returns, the cropping system should be planned first, then the livestock system planned to fit it. Some adjustment of the two is then permitted, but is viewed as a comparatively minor matter. The reasoning behind this procedure usually is that land, after all, is the basic resource of any farm business, and the principal aim should be to achieve optimum returns from it. Livestock, on the other hand, is considered as a means of marketing the crops produced, particularly roughage, and the labor and management of the farm operator.

Recommended Order Has Weaknesses

This recommended order of procedure has some failings. There are at least two cases in which planning the cropping system first and then the livestock system to fit it would not result in the maximum net returns for the farm business as a whole:

(1) Where planning results in the marginal return to labor, management, and capital being greater (or less) for the livestock enterprise than for the cropping enterprise.

(2) Where feeds are fed at a point other than that at which the marginal rate of transformation of the feeds equals the ratio of their prices.

The first of these two cases may arise on any farm. As intensity increases, the marginal physical product of the various crops on fixed acreages will eventually decline. This decline will continue until the marginal value product is less than the marginal value product of a livestock enterprise might be. In this case, the farm operator could increase his net returns by decreasing the inputs of labor, management, and capital allocated to his

crop enterprise and increasing those allocated to the livestock enterprise. When, however, the cropping enterprise is planned first, this factor of equal marginal returns from a livestock enterprise must be ignored.

An extreme example is that of a comparatively small farm located near a large fluid milk market. Maximum land utilization might indicate a heavy production of concentrates as being most profitable if the cropping system is considered in isolation. When, however, the livestock system is considered, dairy production (and thus pasture and roughage perhaps otherwise unavailable or very expensive) offers the most profitable manner of marketing the labor, management, and capital of the operator. If each of these factors were perfectly divisible, and if alternative markets existed for each, then those not used on the farm could be sold. This could indicate that the recommended system might still lead to the most profitable operation. This, however, is not the case. The farm operator, having committed himself to farming, is faced with these fixed factors. And he must market his factors through the products produced on his farm.

The second case cited above is somewhat more complex. Optimum returns from livestock are received by feeding at the level where the marginal rates of transformation of the various feeds just equal the ratios of their prices. (There is one minor exception to this, when a point near stomach capacity of the livestock is reached, but this need not concern us here.) In other words, considering just grain and forage, if two pounds of forage are equally transformable into livestock products with one pound of grain, and if the price ratios are such that one pound of grain costs as much as two pounds of forage, equilibrium exists. On the other hand, with the same transformation rates, if the prices were in the ratio of three to one instead of two to one, it would then be profitable to substitute forage for grain until transformation rates again equalled the price ratio.

Theoretically, a farmer might plan his cropping system first and then sell some or all of his crops, using the returns to buy feed in such a manner as to achieve highest profit feeding conditions for his livestock. Actually, however, this does not happen.

First, there is a certain cost involved in selling feed produced, and in purchasing other feed. Even if this cost be nothing more than the operator's own time and effort, it still exists. Secondly, some of the feeds produced or desired for livestock may not be easy to buy or sell. This is particularly true of pasture, hay and silage, and probably also for new corn (except at a considerable discount). Imperfections in the markets for hay and particularly pasture are quite pertinent. Pasture rental is difficult, both from the standpoint of the lessee and lessor. Pasture rentals often are considerably below the marginal revenue productivity of the pasture itself, making it uneconomical to rent pasture to others. Too, farmers wishing to lease pasture themselves often find none conveniently available.

Because of these circumstances, a farmer who has already planned his cropping system is likely to find it more profitable to feed largely what he has on hand. This is particularly true in the case of forage, even though it means feeding at some point other than that of optimum returns. If, in such a case, the loss from less-than-optimum feeding practices in livestock production is greater than the gain from the use of optimum cropping systems planned in isolation, then planning the two enterprises in the manner recommended will not lead to the greatest total return.

Conclusions

It may be concluded, then, that to actually assure the highest net return for the farm business as a whole, the cropping and livestock programs must be planned together, with attention to each of the various maximizing criteria. Planning either enterprise first and then fitting the other to it may not lead to the optimum use of resources available to the farm operator.

This does not mean that as a general teaching and planning device, the recommended procedure of cropping system first should be abandoned. From the viewpoint of convenience in planning, particularly for the practical farmer, such a procedure probably is desirable. It is easier for most farmers to plan their farm business efficiently on the basis of cropping system first. In most cases, fewer mistakes will be made, and optimum operating efficiency more nearly approached by using this method. Most farmers plan to operate only within a certain range of the optimum point, not at the exact point itself. Variation in such non-controllable factors as weather makes this sensible. It should be remembered, however, that there are cases in which the cropping system should not be planned first, and that if everything were done exactly right, planning crops first would not always result in as high net returns as planning the farm business as a whole.

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FARMER COOPERATIVES AND ECONOMIC WELFARE—A REPLY

PROFESSOR EUGENE CLARK has made a very interesting attempt to construct a theory which should explain the price policy of farmer cooperatives.¹ Because he is in a hurry to use his new theory for suggesting changes in the taxation of farmer cooperatives, it seems worthwhile to see how reliable and realistic this theory is.

¹ Cf. Eugene Clark, "Farmer Cooperatives and Economic Welfare," *This Journal*, Vol. 34, February, 1952, pp. 35-51.

It is a well-known fact that all deductive theories of this kind depend wholly upon the assumptions or premises the theorist has chosen for his reasoning. Let us, therefore, begin with an examination of Clark's premises.

I. Clark starts with a sound proposition concerning farmer cooperatives, viz., "Because the owners are also the patrons, their interest is in maximizing their returns as sellers of farm products or in minimizing their costs in the purchase of supplies." This proposition, however, suggests several corollaries of great importance for a proper understanding of a cooperative price policy, although Clark has disregarded them.

Provisional and Ultimate Prices

The first corollary is that the patronage refund of the purchasing cooperatives to their patrons is nothing but a price reduction. This becomes especially clear when one studies the birth of the purchasing cooperatives in different countries. Very often the farmers begin with sporadic purchases of carloads of fertilizers or feeding stuffs. They distribute the purchase among themselves direct from the railway car. Everyone pays his part of the bill as well as of the freight. Thus a purchasing cooperative can operate on cost basis, without any patronage refund. The latter is used only when the business becomes more complicated and it is technically possible to compute the exact costs only for longer periods. The cooperative then charges a *provisional* price which is paid by the members when they receive the farm supplies. At the end of the year, when all the costs have been carefully computed, the cooperative repays the excess of the provisional price as patronage dividend or refund. Thus the *definite* or *ultimate* price can be defined as the provisional price minus the patronage refund. By analogy, the ultimate price in the selling cooperatives can be defined as the provisional price plus the patronage refund. And the ultimate prices of the cooperatives are not equal to the prices prevailing on the given markets.

This being the case, all the market situations where the farmer cooperative does not have monopoly or monopsony, are imperfect markets with two different prices: the price of the private firm (or firms) and the ultimate price of the farmer cooperative. Now Clark has worked out his theory by assuming that there is a perfect market, i.e., that there is only one price on the market, and the so-called law of indifference (Jevons) prevails. Thus, the market situations which Clarke assumes never occur in reality.

II. Another corollary is that the farmer cooperatives have no independent or autonomous output policy. The purchasing cooperatives have to deliver just the quantity of farm supplies that the farmers (members)

order. The selling cooperatives have to market all the quantity of products the farmers (members) deliver. Thus the cost curves of the individual farms—and not those of the cooperative—determine the output level of the individuals and by doing this determine even the output level of the cooperatives. Even in those few cases when the farmer cooperatives determine the output of member farms, the revenue curves of the available markets and the cost curves of the farms have been considered. Least important are the cost curves of the cooperatives themselves. Thus the “entrepreneurial” interests of the members are vested not in the cooperative but in the farms, the cooperative being only an accessory to the farm. Therefore, it is not “the interest of the members to have operations (of the cooperative) carried on at the scale which gives the minimum per unit cost,” (page 37) but at the scale which corresponds to the aggregate output of all the farms of the members.

Conclusions Termed Invalid

Bearing this in mind one is bound to come to the following conclusions:

a) Not a single one of Clark's conclusions concerning price policy of farmer cooperatives is valid because they have been deduced from the assumption that farmer cooperatives have an autonomous output policy.

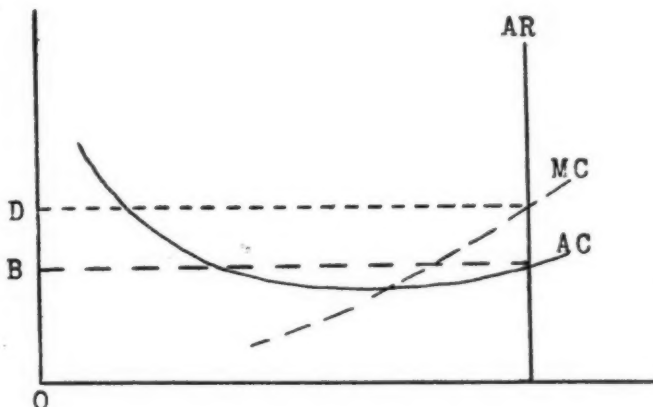
b) Not a single one of Clark's conclusions concerning the evaluation of farmer cooperatives in relation to economic welfare is valid either for the same reason.

III. Even if for a while we would accept Clark's theory concerning the price policy of farmer cooperatives, his welfare analysis is questionable because he pays no attention to the external economies the farmer cooperatives create. In other words, the private cost curves of the cooperatives should be replaced by *social* cost curves and the private revenue curves by *social* revenue curves. The fact that there would be tremendous difficulties in the computation of such social curves does not justify their neglect, especially if one intends to use the conclusions so derived for suggestions in the field of taxation or any other policy.

IV. Let us momentarily accept another of Clark's premises. On page 37, Clark assumes that the members join the cooperatives to obtain “marketing or purchasing services” and therefore considers the cost curve of the cooperative “as including only costs of operation.” This can be done assuming that the cooperative has no influence on the market price. Clark admits further that “the amount of his (farmer's) product for any given period is fixed” (page 37).

As a matter of fact, the farmer can make his own decisions as to his crop output only once a year, if he does not decide to destroy his crops or a part of them. The farmer further patronizes the cooperative without

knowing the exact price of the services. Only at the end of the year, when the farmer gets his patronage dividend, is he able to figure out the actual price of the services of the cooperative *ex post*. It follows that the demand curve for these services must be completely inelastic. This being the case, the average revenue curve (AR) of the cooperative must be a vertical line. The price of the cooperative for its services would be OB while a



private firm under the same conditions would be able to charge as much as it pleases, if it would not be afraid that the farmers can establish their own cooperative. Both the cooperative charging the price OB and the private firm (in case it would charge only the price OD) would operate at the "optimum welfare level." But would the "amount" of welfare achieved be the same in both cases? To answer this question one has to go "behind" the cooperative—to examine how the savings to members influence the economic activities of their farms.

It follows that not even Clark's own assumptions lead always to the conclusions he has reached.

V. In general, we have to conclude that Clark's theory cannot explain the price policy of farmer cooperatives. Much less can it give support to those who insist that the farmer cooperatives should be taxed in the same way as private firms.

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FARMER COOPERATIVES AND ECONOMIC WELFARE—REJOINDER

DR. AIZSILNIEKS has divided his comments on my paper into four "corollaries." This article will deal with them in succession, and then will make a general comment on the place of my analysis in the field of cooperative theory and policy.

First, Aizsilnieks attempts to demonstrate that this author does not recognize the point that the patronage refund must be taken into account in addition to whatever initial price is paid in considering the final price to the farmer (or price paid by the farmer). It is difficult to understand how even a superficial reading could fail to reveal the fundamental place of this point in the original analysis. Explicit use is made in every one of the cases presented of the fact that the size of the patronage refund may vary with variations in the level of operation of the cooperative and so result in variations in the return to the farmer. In fact, Aizsilnieks demonstrates incomplete understanding of this point by limiting his distinction between the initial and final price to "all the market situations where the farmer cooperative does not have monopoly or monopsony." This is incorrect, of course, since the point applies under any market circumstances.

Objectives Misunderstood

In Corollary II, Aizsilnieks declares that "it is not 'the interest of the members to have operations carried on at the scale which gives the minimum per unit cost' but at the scale which corresponds to the aggregate output of all the farms of the members." This appears to be a basic misunderstanding of the objectives of most members of cooperatives and of cooperative management. There may be a few cooperators for whom cooperation has social or religious connotations and who might, therefore, agree with Aizsilnieks' view that cooperation is desirable regardless of cost. However, farmer cooperation in this country has been primarily an economic movement. The explicit objective of farmer cooperation has always been to lower the cost of marketing or of purchasing for the patrons. If this objective is accepted, it becomes a matter of concern to members whether their cooperative is operating at a level which will maximize their returns as sellers of farm products, or minimize their costs as buyers of supplies.

Nor need the members or their management be helpless in trying to attain the optimum level of operations, as suggested by Aizsilnieks when he states that "farmer cooperatives have no independent or autonomous output policy." Cooperatives need not simply accept a level of operation which is too low for the optimum interests of their members. They can

aggressively attempt to raise volume by methods well known to all active cooperators. Similarly, if operations are at a level higher than is to the optimum interest of members (probably a much less common situation), these are ordinarily no reasons why volume could not be reduced in a reasonable period of time.¹

Corollary III questions standard welfare analysis because it does not replace private cost and revenue curves of cooperatives with "social" cost and revenue curves. This statement seems to be based upon a lack of understanding of what is involved in technical welfare analysis. That analysis is explicitly intended to take into account "social" costs and revenues by including and balancing in the analysis the interests of both producers and consumers. This is not the place to demonstrate the point, but reference may be made to any of the standard works in this field.²

Trial Case for Optimum Welfare

In Corollary IV, Aizsilnieks attempts to set up a hypothetical case in which both cooperative and private profit firms would operate at the same optimum welfare level, but at different prices. He then raises the question "would the 'amount' of welfare achieved be the same in both cases," but does not succeed in answering it.

The case presented to back this position does not hold up under analysis. Following this writer's original analysis, Aizsilnieks first points out correctly that the amount of a farmer's product for a given period is fixed. He then concludes from this statement about the individual farmer that, "It follows that the demand curve for the services of the cooperative must be completely inelastic."

It is evident that nothing of the sort follows. Total industry demand of all producers of a given crop will have close to zero elasticity for a given period, but Aizsilnieks has confused this industry demand curve with the demand curve of the individual firm. The individual firm, whether co-

¹ For example, Bakken and Schaars present membership selection as the first of the "basic principles of producers' cooperative marketing associations. . . ." Henry H. Bakken and Marvin A. Schaars, *The Economics of Cooperative Marketing*, New York, 1937, pp. 148-151. Similarly, the legal aspects of the power of cooperatives to reject applicants for membership is considered in Frank Evans and E. A. Stokdyk, *The Law of Agricultural Co-operative Marketing*, Rochester, New York, 1937, pp. 70-75. Evans and Stokdyk state, "Membership is a privilege and not a right. The privilege may be withheld by the association, even though its action is arbitrary and the courts will not interfere to compel admission, for this is a mere matter of internal regulation or policy which is under the exclusive control of the association." (pp. 70-71.) See also their discussion of the expulsion of members, pp. 79-80.

² See for example, Abba P. Lerner, *The Economics of Control*, New York, 1946; J. E. Meade, *An Introduction to Economic Analysis and Policy*, New York, 1938, Part II.

operative or private profit, must compete (even under monopolistic competition) for the patronage of individual farmers. These individual farmers, therefore, have alternative outlets available to them for marketing their product and will tend to choose the one which they expect will give them the best return. Thus, Aizsilnieks is mistaken in supposing that the demand for the services of the cooperative or private profit firm is perfectly inelastic under any ordinary circumstances. On the contrary, the demand curve will be sloped, or, even at the extreme, perfectly elastic as under pure competition.

Even if one accepts the assumption that because of air-tight membership contracts, isolation, or other reasons a cooperative had a vertical demand curve for its products in a short period, it is invalid to transfer this perfectly inelastic demand curve to a private profit firm to find that firm's level of output. It is a well-known conclusion that "If the demand curve were inelastic throughout its length, it would pay him [the monopolist] best to produce an infinitesimal amount and sell it for an infinite price."³

It also may be pointed out in connection with Aizsilnieks' diagram that his cooperative is not operating rationally to give its members minimum costs for their marketing. Rational behavior for this cooperative would be to reduce as rapidly as convenient its volume at this plant to the point where volume was equivalent to the point of minimum average costs. This would give the remaining members the lowest per unit marketing cost. (If it seemed desirable to the persons involved, another plant or a separate cooperative could be formed to take care of those left unserved.) Thus, neither the cooperative nor the private profit firm would rationally operate at the level Aizsilnieks supposes.

Conclusion

Aizsilnieks does make a contribution by repeating the point that the analysis presented in the author's original paper of rational cooperative price and output policy is quite independent of any conclusions one may draw as to public policy with respect to farmer cooperatives. It is important from the point of view of cooperative theory to recognize that, under comparable circumstances, the best level of operation for a private profit firm may be different from the best level of operation for a cooperative. The different objectives of the two types of firms—maximum profit to the firm for the private profit firm and minimum cost to the member-patron for the cooperative—should result in different price and output policies under otherwise similar conditions.

With respect to public policy, this writer holds the view that technical

³ Joan Robinson, *Economics of Imperfect Competition*, London, 1933, p. 53.

welfare analysis is a valuable and objective tool in analyzing the results of cooperative and private profit operation. However, that value is limited in three respects. First, it is limited because of the restrictive assumptions within which welfare analysis must operate. Second, it is limited because of a lack of empirical knowledge as to whether situations in which cooperatives or private profit firms tend to operate nearer to the optimum welfare level are quantitatively more important. Third, there are numerous other economic, social, and legal factors which, although not generally subject to objective analysis, must nevertheless be taken into account in making public policy decisions about taxation or any factor affecting cooperatives and the public welfare.

EUGENE CLARK

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COMMENT ON PROBLEMS IN WOOL MARKETING RESEARCH BY SLAGSVOLD*

IN A recent article¹ in *This Journal*, P. L. Slagsvold presents the thesis that improvements in wool marketing must mark time until specifications and speedy techniques for measuring quality characteristics have been developed.

In his view, "It is axiomatic that wool marketing methods as now carried on, with perhaps some more or less worth-while improvements, must remain roughly as they are so long as quality and value of the product sold remain subject to estimates and guesswork. Consequently, introduction of new methods of marketing is possible only (a) if understandable, reasonably precise, workable, and acceptable classifications and specifications are developed for the various quality characteristics of the product; and (b) if objective methods of sampling and testing of lots can be perfected to permit speedy, accurate, and economical determinations" (p. 532-533). To Slagsvold this is the key to the wool marketing problem because, "If and when these procedures are developed, trading in wool can be done on the basis of description" (p. 534), and marketing costs may be reduced if the producer can sell by mail or telephone . . . though the producer will have to pay for sampling and testing costs (p. 539).

* The author has been engaged (until recently as Cooperative Agent, Bureau of Agricultural Economics at Harvard University) in a study of the marketing and utilization of domestic and foreign wools in the central wool market in Boston and in New England generally. The views expressed in this comment are his own.

¹ "Problems in Wool Marketing Research," *This Journal*, Vol. XXXIII, No. 4, November, 1951, pp. 530-539.

Slagsvold's Theory Reexamined

Slagsvold's assumption that specifications and techniques will cure the ills of wool marketing, and that their absence retards research in this field, needs examination. Standards and techniques for measuring may help improve wool marketing but they are not the sole prerequisites. In Uruguay and Argentine, for example, the preparation and marketing of wool has been improved greatly within the past five or six years without benefit, if we may borrow a phrase from Slagsvold, of "sampling and testing procedures which will give an objectively accurate, speedy, and economical answer to the question of fineness, variability, staple length and . . . other physical—and measurable—characteristics" (p. 534). These South American wools have been improved, and their marketing facilitated, by assorting them into more uniform lots before baling. The seller then knows more precisely what he is selling and the buyer has some assurance of uniform quality.

The advantage of wool standards is not gained by promulgating them. It is gained by having wools assorted so they can be simply and accurately described in terms of the standard. Bags of fleeces that are neither assorted nor skirted² vary too widely in quality for such a standard description, even if an adequate sampling technique could be devised. Much domestic wool is marketed in this condition. As it comes on the market at present, a large part would not fit into any feasible system of specifications. The variability within such lots of wool is too great for practical sampling to give a sufficiently accurate estimate of the quality. Unless the domestic grower can see the advantage of improving the preparation of his wool, and adopts it, there will be little gain to the grower in having standards or techniques for measuring.

Slagsvold's suggestion that domestic growers will be able to sell wool by description (p. 539) also requires scrutiny. Lots of wool or any other commodity can be sold on the basis of description when (a) the product is sufficiently homogeneous to be described in simple terms, and (b) the seller, voluntarily (or involuntarily as with government grading) guarantees the quality described.³ Neither of these requirements can be fulfilled

² "Skirting is the removal of belly, britch, neck, leg, and stained portions from the main part of the fleece and sometimes the backs. It is almost universally done in preparing Australian wool for market and to a considerable extent is practiced in South Africa and South America. It is practically never done in the United States." See *Wool Prices*, U. S. Tariff Commission Report No. 120, Second Series, Washington, 1937.

³ Even wheat, among the most readily sampled and graded farm products, is not sold on description by the grower. It must be inspected by the buyer or a government grader before the descriptive grade is established. Grower sampling and classification of wool is likely to be much less uniform than would be possible for wheat—and correspondingly less acceptable to the buyer.

with domestic raw wool at present because of its inadequate preparation. The establishment of specifications and methods of measuring quality for other farm products has not enabled producers to sell at the farm by mail or telephone description. Wheat, eggs, milk, cream, and other graded farm products are tested and classified at the grain elevator, dairy, etc., after they leave the farm. Buyers cannot be expected to accept growers' sampling and description of wool any more readily than they accept it for other products.

Core Test Not Universally Accepted

Contrary to Slagsvold's statement, the core test for estimating shrinkage is not "accepted without question" (p. 530) by the wool trade. Mill buyers make use of the core test for foreign wools because it is supplied, at no cost to them, through the customs core test analysis on dutiable wools. Such is not the case with domestic wools. In a recent sample survey of topmakers and manufacturers in the New England States, the writer found that opinion was unanimous that domestic wools, as marketed by growers, are too poorly prepared for the core test to give accurate estimates of shrinkage—that there are too many qualities intermixed, too many tags, too many black fibers, and too much foreign material. Only one topmaker used the core test description as a basis for estimating shrinkage on domestic wool purchases and he insisted that cored wools first be well assorted and graded by a reputable warehouseman in the West. All other Eastern mills preferred to depend primarily on the inspection of domestic wool by their own buyers. If mills are not prepared to accept the core test as a measure of the shrinkage of domestic wools, as currently marketed, they are unlikely to accept other such tests as a satisfactory measure of their fineness, length, soundness, etc.

Establishing standards and developing techniques for measuring quality characteristics of domestic wools can contribute to improving their marketing, but the contribution is conditional from the viewpoint of the grower. Unless preparation can be improved while the wool is still in the growers' control, such standards and techniques will benefit chiefly the wool trade. This will be a contribution to marketing improvement but it needs to be carried back closer to the grower. Before the core test or other techniques of description can be made effective for growers, domestic wools must be made more uniform, either on the ranch or in nearby warehouses.

A great deal of extension work is necessary to encourage improved preparation. More tagging and skirting needs to be done, black fleeces should be separated before shearing, more care should be taken on the shearing floor and in assorting and packaging. Even more important is the need for uniformity of preparation among growers. So long as each

grower depends on his own judgment for the quality of preparation, there will be many kinds of preparation put on the market. When the quality of wool described by a given grade varies from grower to grower, "grade" has little significance to the mill buyer.

To improve growers' returns, the following should therefore be added to Slagsvold's outline of research studies needed in wool marketing:

(1) Organization of shearing, assorting, and packaging on the ranch to analyze the adjustments necessary for better preparation;

(2) Grower needs for extension services to aid him in placing a uniform quality of wool on the market;

(3) Structure of the market for wool to aid the grower in obtaining the increased value added by preparation;

(4) Effect of the increasing competition of the highly uniform, new synthetic fibers on the prices of wool;

(5) Extent and origin of black fibers within fleeces in Territory wools;⁴

(6) Advantages and disadvantages to growers of selling by pre-shearing contract and selling on a grease rather than a clean basis. Both these methods may inhibit improved preparation by encouraging neglect of the variations in shrinkage and quality.

As a result of the increasing competition of well-prepared foreign wools and some of the newer synthetics, poorly-prepared domestic wools are likely to be at an even greater disadvantage in the future. A solution to the problem of careless preparation is thus becoming urgent. Much valuable time may be lost if we follow the theory that an improvement in marketing will come—and then almost automatically—only after a set of standards has been declared and measuring techniques developed.

Conclusions

Slagsvold's error arises from his dependence on a "*Post hoc, ergo propter hoc*" assumption, i.e., that because, for some other commodities, marketing improvements have come after the promulgation of grade specifications, they are therefore the result of promulgating the specifications. Most marketing men would argue that both the marketing improvement and the effectiveness of the specifications are the result of the growers becoming aware of the market needs in terms of quality and condition of the product and gaining a knowledge of how to meet those needs.⁵ Unless the grower appreciates these needs and tries to meet them in his production and marketing practices, grade specifications are likely to be of no advan-

⁴ Manufacturers maintain black fibers are within fleeces. The Production and Marketing Administration claims they result from failure to segregate black faces and black fleeces from other wools, see *Domestic Wool Requirements and Sources of Supply*, U.S.D.A., 1950, p. 18. The distinction is very important from the breeding standpoint.

⁵ Extension programs are seldom given the credit that is due them in this respect.

tage to him. What is needed is a first-rate extension program in the preparation and marketing of wool to go along with the specifications.

The danger of the Slagsvold approach lies in its implicit argument that the growers themselves need take no action to improve marketing—that improvement can be left to the inventive scientists who can devise techniques for measuring quality characteristics and the specifications to go with the measurements. Such a view has been a part of the arguments of the protagonists of the wool grower for many decades.⁶ It is time a more realistic view was taken. Action must be taken at the grower level if the marketing of domestic wool is to be improved. Marketing extension must reach right to the shearing shed.

The problems in wool marketing cannot be solved by such physical measurements and scales as Slagsvold suggests. A physical solution is only attractive because it presumes to require no change in the existing organization of grower activities. The solution of the wool marketing problem, as with most marketing problems, requires changes in man's way of doing things.

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COMMENTS ON PROBLEMS IN WOOL MARKETING RESEARCH

A REJOINDER

D W. CARR may not have read my article very carefully and, therefore, attributes to it certain statements and implications which are not there.

For example, he assigns to the article the assumption that the specifications and techniques, such as outlined, will cure all the ills of wool marketing. The article actually points out that improvements in wool marketing of any great consequence can only come with development of speedy and accurate techniques for sampling and testing for quality characteristics and development of appropriate classifications to cover differential values. In this connection, Carr refers to improvements in wool marketing which have taken place in Uruguay and the Argentine without benefit of the techniques and procedures outlined. These improvements, if they have taken place, do not preclude the need for scientific procedures, rather than guesswork, in determining the actual contents of the bales or bags of wool being appraised or sold.

⁶ Wool tariffs and the Wool Products Labeling Act of 1939 have appealed to the champions of the wool grower because both tend to protect the domestic grower's market while requiring no change (and encouraging none) in grower preparation and marketing.

Carr evidently believes that people who work with wool are endowed with microscopic eyes, which register fiber fineness and standard deviations in microns and coefficient of variability in per cent, when they "assort" wool, as he terms it. The facts are that rough classing of fleeces into broad grades, using for example the American Blood system, such as Fine, $\frac{1}{2}$ Blood, etc., can be accomplished by a person with some experience in doing this work. It also is true that, with much more experience, a person can sort the individual fleeces into matchings which will be more or less uniform in character. That such grading and sorting is uniform on the basis of quality factors and, in addition, infallible, is, of course, erroneous and certainly not borne out by facts, neither in this country nor elsewhere. The experiences by nine western states and the Production and Marketing Administration in conducting wool marketing research since 1947, with special emphasis on better preparation of wool clips on ranches, prove the point.¹

Carr apparently thinks that wool growers in the United States should grade and sort their clips prior to marketing and also that they are equipped to do it. I wonder if he would make the same recommendation to wheat producers and cotton growers. Simply because adequate methods of sampling, as well as methods for testing for quality, were developed in the case of wheat, this did not mean that producers of wheat should begin "assorting." What it meant was that the development of techniques and procedures for sampling and testing permitted wheat producers, by and large, to know more precisely the quality of their product. Through long years of experience, the various qualities involved were defined and certain grades or classes based upon them were established. Incidentally, this development also has permitted wheat to be sold on the basis of description.

Growers Should Have Wool Tested

The major point made in my paper is that, from the standpoint of practical operations, the wool grower, as well as a handler or a dealer, can have his product sampled and tested (after some preliminary grading if the lot is quite variable), and thereby find out more or less precisely what he has to sell. Even if wool growers themselves may not all be able to grade their clips, at least rough classing or a good job of grading can be obtained at relatively low cost on the ranch or in a local warehouse. If random samples from wools are drawn, and if these samples are subjected to analysis in a modern wool laboratory, the grower not only will know how much clean wool is in his lot of grease wool, but he also will know with considerable degree of accuracy the fineness, staple length, variability, color, and strength.

¹ Results of this work are not yet published.

Carr mentions that the core testing for shrinkage is not accepted without question by wool growers and by the trade. Undoubtedly one can find wool growers who still refuse to accept available proof that this method of sampling and testing is vastly superior to the use of plain guesswork. It likewise is true that some top makers and manufacturers will state that they do not rely upon the core test. It may not be known generally that many of these same firms either have their own sampling equipment and testing laboratories or the sampling and testing is done for them by a commercial laboratory.

In this connection, it is interesting to note that one of the organizations in Boston which annually handles a tremendous quantity of domestic wool probably raised more objections to the core test under the government price support program during 1947 to 1949 than all of the rest of the trade put together. Yet, it is doubtful if this firm has sold much wool in recent years without first having the wools tested for shrinkage by a commercial laboratory. When Carr states that only one top maker uses the core test on domestic wool, it should be pointed out that the sample survey, upon which his statement is based, included only a very small percentage of the top makers in the country and most of them were processing imported wool, all of which had been core tested for shrinkage by the Treasury Department.

It is true that core testing for shrinkage may not be as accurate on highly mixed wool as it is on graded or sorted wools, at least if the standard sampling pattern is used. This problem applies to any testing, whether wool or other commodities. For this reason, in the government price support programs for wool, core testing for shrinkage is undertaken only if the wools involved are fairly uniform or, if not, after the lots have been graded. The same thing applies to commercial wool testing. This is a simpler procedure than developing sampling patterns for mixed lots.

Scientific Methods Versus Guesswork

The major points in my article, based upon several years' experience in wool and wool marketing research, were the advantages of sampling and testing by scientific procedures and techniques, as compared with present methods which involve guessing as to what may be inside of a bag of wool. This obviously does not prevent wool growers from taking steps leading toward improvements in marketing practices. It might be added that the Livestock Branch of the Production and Marketing Administration is making excellent progress in the development of sampling and testing procedures for determining fineness, staple length and variability in grease wools. In cooperation with several Western states, work also is under way to improve clip preparation and packaging.

It may be of interest also to know that one of the leading woolen mills in this country is now experimenting with the procedures recommended in my article, although at present their sampling and testing cover only fineness and variability. Moreover, one of the largest wool handlers in the country recently expressed in print a very favorable reaction to the innovation. On six clips, graded in a warehouse in 1951, random samples from the major lines were drawn by the Livestock Branch of PMA and were tested for clean content and quality factors. Subsequently, portions of each graded line were combed and samples drawn from the scoured wool, card sliver, top and noils. These samples also were tested in our wool laboratory. The results of the sampling and testing showed very close concordance between the tests on the grease wool and the resultant top.

Sampling and testing problems for wool are many and not altogether simple from several standpoints. However, with perseverance, time, and cooperation, it will be possible to give wool growers the benefit of a scientific approach to the definition of their product, as has been accomplished for a host of other farm products.

In conclusion, it should be pointed out that the recommendations for improvements in wool marketing mentioned by Carr were all discussed in my paper.

P. L. SLAGSVOLD

Washington, D.C.

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- * "Turning the Searchlight on Farm Policy," Chicago: The Farm Foundation, 1952, Pp. 82.
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A Correction

The reviewer of Dr. Warren S. Thompson's study on *Migration Within Ohio, 1935-40*, wishes to correct an unfortunate error appearing in the May issue of *This Journal*. The surname Thompson should be substituted in place of the given name Warren in two instances of the last paragraph of the review.

* Reviewed in this issue.

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BOOK REVIEWS

Turning the Searchlight on Farm Policy, The Farm Foundation, Chicago, 1952. Pp. 82.

This report was prepared by a committee of nine agricultural economists selected from the land grant colleges, plus T. W. Schultz, E. G. Nourse, and two other outside economists, and was set up for this purpose by the Farm Foundation. O. B. Jesness was chairman of the committee, and Nourse did the drafting of the text of the report.

As one would expect, the report has very much in common with the last statement on farm policy prepared by a committee of the Land Grant College Association. It differs in two major respects: (1) It is narrower, limiting its scope to price support—any other program features mentioned are considered only from the standpoint of their relation to price support; (2) It is still more negative.

The conclusions of the report can be summarized simply and briefly by stating that it proposes to scrap the Production and Marketing Administration program except for "income supplements . . . for times of general and severe depression," and a limited amount of "credit or purchase operations in farm commodities" . . . "as a buttress to the income-supplement program," and "for military stockpiling." No indications are given as to the level of these income supplements except they are to be related to "trends during a suitable recent period, in general using the statistics of the year just preceding." The size of the payments is to be announced "for the ensuing year," and "the income flow" is to be "started promptly." However, it is to be left to Congress to start and terminate these payments "by joint resolutions" except as the President (with such advice and assistance as he might derive from the Council of Economic Advisors, the U.S.D.A., and the Bureau of the Budget) may suggest such action by Congress.

Other than the foregoing, prices, production and consumption of farm products are to be left to the free play of economic forces and to the individual decision of the farmers, consumers and middlemen, except as they may be assisted in their decisions by the public information services and extension education now available. There is a statement to the effect that these aids will be more effective if they are not interfered with by production and other controls; but little if anything is said about expanding these aids.

The justification for proposing this abandonment in large part of present government action programs in agriculture is that these programs were born in the Great Depression, and continued because of World

War II and its after-effects. But as such, they are a "legacy from the past" and should be replaced with a program that is more in keeping with the favorable peacetime outlook for American agriculture in the decade ahead.

The report is in three parts, the first presenting the history of price-support policy, the second an analysis of this experience and the outlook for agriculture, and the third the recommendations of the committee. Part I will prove useful as a concise factual summary of the changes in the AAA and PMA programs from 1933 through 1951. This reviewer's only comment on this section is that these programs were conceived by those who helped frame them in the USDA, and by part of those who pushed them through Congress, in a larger framework than mere price supports. There is no recognition of this in the report. Even as late as 1948 and 1949 these broader objectives were still present. It would be difficult to prove that price support was even the dominant objective in 1933. It surely became so with the recession in 1937-38, and even more so subsequently.

Strong supporters of present programs will find much objectionable material in Part II. This reviewer finds relatively little else with which to object. He agrees that the "parity label" is greatly abused. In fact he would point out that it is now being much abused under the term "effective parity" in every report on support prices now issued by the BAE. He does not agree that "ample credit" . . . "is now available under long-term amortized mortgages." He would insist that more mortgage loans need to have variable payment provisions, and more need to be budgeted or open-end loans. He does not believe that foreign outlets for farm products offer the promise indicated in this report; nor has he as much faith as the committee in a "world-wide movement" . . . "toward economic expansion" and toward preventing economic depressions. He expects to see supplies of some farm products pressing strongly on their markets much of the time from 1953 on, and of a considerable group of them at times. Lastly, he does not have the confidence that the committee seems to have that government will be able to check the growing monopolistic economic power of organized labor, nor the tendency of the collective-bargaining process to raise wages and pass these on to the public in higher prices, nor that such price competition as still remains in retail and wholesale markets will keep margins from supporting too expensive a distribution system.

As for Part III, this reviewer is in hearty accord with the committee that a change in the farm program is urgently needed, even in the next Congress; but he is sure that the one the committee has outlined is not the one that will be adopted. He would favor its adoption if there

was any chance of its being adopted, not as the final program, but as a foundation from which to start. The final program will need to include in addition:

A. Provision against severely depressed prices of individual products, due to:

- (a) "Chronic surplus" conditions, because of loss of markets, new technology, etc.
- (b) Unusually favorable weather for a few years, sometimes for one year only.
- (c) Overplanting or overbreeding for a few years.

Perhaps this is what Schultz has in mind in his signed footnote:

"When we return again to a greater reliance on markets and the decentralization of economic organization that this makes possible, I would place great stress on the need for reducing the instability of farm prices which is a consequence of the following conditions: (1) that both the demand and the supply schedules of farm products have a very low elasticity (2) that large and abrupt shifts in the demand schedule occur frequently, and (3) that substantial variations in production caused by weather and other exogenous factors occur from time to time."

B. More definite advance indication of the prices and incomes to be received and amounts likely to find a market than the producer now obtains from market information. This could take the form of:

- (a) The forward prices proposed by T. W. Schultz and Gale Johnson, provided there is included with these a variable schedule of prices according to supply that will keep the net return from outputs of varying sizes about stable. The forward prices and incomes need not be the full equilibrium prices and incomes anticipated but they should ordinarily not be less than 90 per cent of these.
- (b) The "total annual quotas" and market prices plus supplementary payments outlined in Chapter XXI of Black and Kiefer's *Future Food and Agricultural Policy*. These likewise need not provide full equilibrium price and income levels.

C. Provision for securing additional consumption by low-income families, school children, etc., of a considerable part of overlarge supplies of farm products, as part of a general program of subsidizing larger consumption of protective foods by these groups.

D. More assistance to individual farmers, and more direct and specific assistance, in mapping out the production adjustments that will fit their operating plans to changing technology and demand.

E. More credit in forms and under terms that will assist in the financing of such adjustments.

No Congress in prospect in the next 10 years will accept a program as negative as that proposed by the committee. There is a chance that

the next Congress, or the one following, would accept the A and B provisions above if most agricultural economists got vigorously behind them, and especially if they could get two or three farm organizations to do so. If A and B came into operation, the way would be open presently for D and E. Provision C is likely to receive strong support in the next period of excess supplies of farm products.

Finally, the committee proposes scrapping of the parity standard. It may be more realistic to revise it as needed to serve as nearly as possible as a standard for the A and B provisions.

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Readings in Agricultural Economics, carrying subtitle, Rehabilitation of Low-Income Groups in Agriculture, Indian Society of Agricultural Economics: Fort Bombay, 1951. Pp. 288. Rs 9. Also by the Society a Summary of a report by Olaf F. Larson, *Ten Years of Rural Rehabilitation in the United States*. Pp. xix, 150. Rs 5.

Food and Agriculture in Madras State, B. Natarajan, Government of Madras, 1951. Pp. xxi, 257. Rupee one.

It is always difficult for the poor and the rich to learn from one another even though there exists a large measure of good will and a desire to do so. Clearly, the possibilities in agricultural economics between India and the United States are no exception to this rule.

In preparing the readings and the supplementary volume under review, the Indian Society of Agricultural Economics has drawn heavily upon the work of Americans. This attention given to our work deserves our appreciation, but, as this reviewer shall endeavor to show, it is not easy for them to draw useful lessons from what we have done for ourselves. The basic difficulty arises from the very simple fact that our agricultural production and food consumption represents a community with a thick layer of capital, a high output per person, and a high level of consumption, whereas India produces and consumes under wholly different conditions.

The readings, for example, include a paper on the food stamp plan. This plan, however, is a luxury which no *high-food-drain*¹ community can afford. Such a community is not likely to have any extra food around to distribute to the poor because nearly everybody is poor and most of the income of the community is used to acquire food. Or take farm

¹ It is useful in studying economic development to classify communities according to the drain of food on the economy. By a high-food-drain community, we mean one in which 75 per cent or more of the income of the community is needed to acquire food. This concept and classification is set forth in T. W. Schultz, *The Economic Organization of Agriculture*, McGraw-Hill, 1952.

leases for corn belt farms, which are operated with little or no hired labor and which represent \$100,000 of physical assets. These particular leases have no relevance whatsoever to the conditions confronting poor Indian cultivators. Debt adjustments in a rich country following a great depression have little in common with the problem of chronic debts that burden many farmers in India. Nor is the TVA experience a useful model for India in developing her agriculture because this model requires an exceedingly large amount of capital, one which only a rich country can command. There is also the fact that the TVA has not been of much help in correcting the low output in agriculture in the Valley; its contributions have been in other directions.

Natarajan's careful study of the Madras, with its population of 56 million confined to an area about twice as large as Arkansas, permits one to take the economic pulse of food and agriculture in India. We are quite unfamiliar with the beat of a pulse such as this; moreover, to understand its implications, some of our preconceptions must go. The American readers will find data and analysis on the following three important issues:

1. While in Western countries long-run developments have relaxed greatly the relative claims of food, in Madras one sees a gradual closing of the food-population pincers. Three decades ago, for example, the amount of food available per adult, per day, may have been about 22 to 24 ounces. In recent years, this figure has declined gradually to 14 to 15 ounces. Suppressed starvation has, as a consequence, become widespread.

2. Specialization and division of labor including trade are an integral part of the economic structure of Madras. Moreover, these are developments which have emerged gradually. Natarajan traces the dependency of Madras on food imports beginning about two centuries ago, first rice from Bengal and later from Burma. The vast wartime and post-war disturbances affecting rice production in Burma and trade generally have had serious adverse effects upon the food supply available to Madras. It already was exceedingly vulnerable because of the food-population pincers and, in addition, because of the sequence of bad crops beginning in the middle 1940's.

3. There have been many food production drives organized in recent years by the provincial and central governments and they include a wide range of measures. Few, if any, possibilities for increasing the output of food have been neglected. Americans often are inclined to the view that a few of our technical tricks would quickly increase the output of food in a community such as Madras. We would do well to take stock of what Indians actually are doing: land is being reclaimed; by 1947-48 there were 13 land colonization societies in Madras; special

development schemes for the malaria-ridden areas sparsely populated by backward tribes have been organized; new irrigation projects are being developed; some tractors, especially bulldozers, have been made available to clear new areas; new wells are being subsidized; schemes to apply manures and the use of oil cake as fertilizer exist; other efforts include the improvement of seeds, the allocation of more iron and steel for agricultural implements, and procurement of electric motors to pump water.

Nor does this complete the list of what is being done. Madras is one of the most progressive parts of India and the prospects for economic development are better than they are for most of the sub-divisions of India. But even so, and with the help of the fine study under review, it is still very difficult for one acclimated to production and consumption of a rich community to comprehend the basic attributes of the economy of Madras.

T. W. SCHULTZ

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The Soviet Economy During the Plan Era, Naum Jasny, Food Research Institute, Miscellaneous Publication 11A, Stanford, California: Stanford University Press, October, 1951. Pp. 116. \$2.00.

The Soviet Price System, Naum Jasny, Food Research Institute, Miscellaneous Publication 11B, Stanford, California: Stanford University Press, November, 1951. Pp. 179. \$2.00.

Soviet Prices of Producers' Goods, Naum Jasny, Food Research Institute, Miscellaneous Publication 11C, Stanford, California: Stanford University Press, February, 1952. Pp. 180. \$2.00.

In these three volumes Dr. Jasny has expanded his range of interests from Soviet agriculture, which he discussed in his impressive *Socialized Agriculture of the U.S.S.R.*, to Soviet industrialization. These studies, which form a unit, deal with the changes in the volume of production and prices in the principal sectors of the Soviet economy since 1928.

Unlike the "standard" works of Baykov and Dobb, which tend to analyze Soviet plans and policies with little emphasis upon statistical analysis, these works are primarily statistical in nature. Dr. Jasny's findings set forth the main factual background with which the student of the Soviet economy must reckon. His data indicate a reduction in the importance of consumption (including education and health) from 80 per cent of the net national product in 1928 to 38 per cent in 1948. Although the net national product in 1948 was 2.5 times as great as in 1928, total consumption had increased less than 20 per cent, and per capita consumption probably showed no increase at all.

This pattern differs markedly from that in most developing countries, where living standards have risen with total production. It has been made possible by a retail price-wage spiral from 1928 until the end of 1947; a tax system which makes the state virtually the sole beneficiary of profits arising in the inflationary process; and a system of agricultural prices which has made the farm population bear a considerable part of the real costs of industrialization. Dr. Jasny performs a useful service in stressing the last factor, pointing out, for instance, that although retail flour prices in 1948 were about 40 times as high as those in 1926-27, the price paid by the state for grain procurements had risen only 30 per cent.

Dr. Jasny's statistical empiricism is in considerable contrast to the older emphasis upon Soviet policies and planning techniques, and the more recent emphasis in the Columbia Russian Institute upon "conventional" economic analysis. Dr. Jasny, unlike the former, tends to deduce official Soviet policy from the statistical record rather than from Soviet policy pronouncements; unlike the latter, he does not attempt to analyze the data in terms of what might be called "laws of Soviet economic development." He considers these alternative approaches as inconsistent with sound scholarship and even intellectual honesty, and non-Soviet authors are treated with an acerbity matched only by his treatment of Soviet sources. It is unfortunate that irrelevant *obiter dicta* of a personal nature have not been removed in final drafts of these books.

While Dr. Jasny's analysis is a most useful antidote to an incautious or superficial interpretation of Soviet propaganda, and to theorizing on the basis of inadequate data, certain difficulties in presentation might have been avoided had he not refrained from a theoretical analysis of his subject. Thus, one of his principal conclusions is that "The most highly perfected device of the Plan era . . . was that for keeping down consumption."¹ One of the most important instruments of this control is the "turnover tax," a sales tax. According to Dr. Jasny, the rates range "from about 30 to 75, but up to 88 per cent of the price, the price being either at wholesale or retail—in both cases including the tax."² Dr. Jasny's analysis of the effects of the tax assumes this tax to be merely an excise tax and neglects the role of the tax as a control device. If the turnover tax did not exist, according to his argument, consumer prices would actually be lower by a corresponding amount. However, given Soviet investment-armaments and consumer goods programs, the abolition of the tax could lead only to enormous profits by producing enterprises (if prices were at "market" levels), or of enormous unspendable cash holdings of individuals (if prices were at present levels net of tax). The

¹ The Soviet Economy during the Plan Era, p. 86.

² The Soviet Price System, p. 74.

first eventuality would make it very difficult for the authorities to put pressure on consumer goods industries to hold down costs or to control the allocation of their profits; the second would make it difficult to provide incentives for individuals, or indeed to control their activities except by direct force. Either would create a problem of obtaining funds to finance investment and armaments. In these circumstances, the turnover tax should be considered as an instrument of control in a situation which would otherwise be hopelessly inflationary, and not simply as an excise tax. Dr. Jasny's empiricism does not consider this function of the tax.

All Soviet prices except the "free" market price are fixed by administrative decision. Price fixing must involve a cumbersome analysis of the effect of price changes upon demand of individuals and enterprises, upon profits, upon the cash resources of enterprises and individuals, upon the costs of buyers and upon state budgetary revenue (which is affected by changes in profits or in turnover tax rates). It also involves complex decisions as to the allocation of fixed costs in industries producing many types of goods. All of this is indicated by Dr. Jasny. We can perhaps agree with him that if the Soviet government raised drastically prices of industrial goods in 1949, and cut the same prices in 1950, some error in planning may have taken place. However, we know so little about the actual situations in particular industries that it seems a little extreme to say, as does Dr. Jasny, that "the Soviet price system was in a chaotic state during the whole Plan era."³ Such a statement implies that we have a clear idea as to what might consist an "orderly" price system in terms of the objectives of the Soviet bureaucracy. Dr. Jasny, unfortunately, has not specified what such a price system might have been.

It is to be regretted that Dr. Jasny has not treated the question of subsidization except as a statistical problem. He indicates that it is Soviet policy to hold down the prices of all materials; he also implies that at times fabricated goods other than consumer goods may have been subsidized, and that in fact the total volume of subsidies in industry in 1948 may have been roughly equal to budgetary investment in construction and inventories.⁴ It would be curious to find the perpetuation of a system in which the state permanently subsidizes enterprises very heavily simply in order that it may itself purchase cheaply the goods which they sell. Is this policy simply a part of "the Soviet enigma," or has it an economic rationale? Is it, indeed, of any significance in aiding the government in carrying out its objectives?

³ *Ibid.*, p. 8.

⁴ *Ibid.*, p. 87. The figure assumes that virtually all of a large unexplained residual in budget appropriations was used for subsidies.

One of Dr. Jasny's great virtues is the fact that he does not consider his own work as being in a final stage. It is to be hoped that he will treat these works as progress reports toward a study which will deal with the statistical record of Soviet development in terms of the instrumentalities of economic controls, and in such a way as to spell out to the reader the laws which he feels govern the pattern of Soviet industrial expansion, and the limitations on the totalitarian planning process, both inherent and specific to Soviet conditions. Such a book would be an even greater contribution to economic thought than these three are of interest to the entire profession, as well as to the specialists who will be able to absorb the specialized material in the volumes under review.

EDWARD AMES

*Board of Governors, Federal Reserve System**

A Theory of Price Control, John Kenneth Galbraith, Cambridge, Massachusetts: Harvard University Press, 1952. Pp. 81. \$2.00.

This little book, which is a composite of several earlier articles by the author, has two general themes: first, that price control worked because "it is relatively easy to fix prices that are already fixed;" and second that the marginal utility of money must not be permitted to fall to the point that it causes a general withdrawal "of marginal labor effort." The money increase permissible before this relationship arises is called "the margin of tolerance."

Within the framework of these two relationships, the job that price control and rationing may do is fairly well marked out. Strict price controls can be exercised on all goods sold to a relatively few well established customers by a few producers. Under these circumstances rationing is readily enforced by arrangements worked out between purchasers and sellers. Strict price controls also can be exercised on goods produced by a few producers and sold to a large number of relatively irregular customers. Here, however, rationing must be enforced by the state. The markup problem, which at first glance would loom large, is lessened by the traditional markup pattern which has proven to be very firmly fixed.

This leaves the problem of the goods produced by a large number of producers and sold to a large number of buyers. Here the tradition of a markup percentage does not exist and the self interest of neither party is served by an allocation program. The buyer is willing and anxious to pay higher than the ceiling price and the producer is under no compulsion to allocate goods on the basis of any prior buying pattern.

*The views expressed in this review are not necessarily those of the Board of Governors.

Direct controls are faced with the difficulties which have made traditional economists very pessimistic of the usefulness of the device. However, it is also true that normally this is a relatively small segment of economic activity and can be expanded readily only in the livestock and meat markets. The rule to follow here is to set price ceilings and quotas so as to avoid pressures which, if permitted to develop, may cause a breakdown of the entire scheme.

If a nation has recently experienced deflation, the margin of tolerance is much greater than if inflation had been the most recent experience. If the margin of tolerance is limited, greater reliance must be placed on fiscal and monetary policy for price controls, and the accumulation of cash balances soon will reduce productive effort.

The first six chapters are a presentation of the broad principles developed during the price control, rationing, and material allocation programs of World War II. They are excellent and should be considered required reading. This, however, cannot be said of the last two chapters, which deal with direct controls under limited mobilization. Here Professor Galbraith is much less helpful, perhaps partly because his mind is still largely absorbed with World War II relationships.

For example, on Page 67 Galbraith assumes that what is "to be spent for arms . . . must be taken as given." This is quite counter to the facts of our 1951 and 1952 experience. Our arms program instead has many similarities to a well-developed reserve shelf of expenditure projects. An arms program may be modified in many ways under limited mobilization, including the quantity and types of materials going into arms.

In the discussions of these last two chapters, there is continual reference to the idea that limited mobilization requires a degree of over-employment—although this term is not used—which results in a constant upward pressure on prices from cost-shoving. It is argued this pressure can be relieved by price and wage controls in such industries as steel, electrical, chemical, automotive, and the like. Although this reviewer does not wish to go into the weaknesses of such a limited price and wage control program, it should be pointed out that limited mobilization and over-employment are not synonymous. It certainly would be possible for over-employment to exist without a limited mobilization and for a limited mobilization to exist without over-employment. In other words, the arguments of the last two chapters are not particularly related to limited mobilization but are rather an argument for direct controls over prices and wages in selected monopolistic-competitive industries whenever cost-push pressures on prices are evident.

RICHARD W. LINDHOLM

Michigan State College

The Design and Analysis of Experiments, Oscar Kempthorne, New York: John Wiley and Sons, Inc., 1952. Pp. xix, 631. \$8.50.

A rapid growth in the statistical theory of the design and analysis of experiments during the past three decades and the current extensive application of this theory creates a demand from both the experimenter and the statistician for comprehensive, textbook treatments of the subject. The present status of the theory of experimental design has been attained through the application of increasingly complex mathematics; the student of statistics, therefore, requires the text to be essentially mathematical in nature. The experimenter, on the other hand, understandably balks at the more advanced mathematical concepts, thereby rendering it a difficult if not impossible task to write a text which fully meets the needs of both groups. This book represents a commendable attempt to satisfy the experimenter and the statistician, with a slight favor being given to the view of the latter; both will find much sound information here, and both will find the book wanting in some aspects.

The first four chapters of the book are devoted to fundamental statistical notions and are aimed primarily at the nonstatistician; the student should have mastered these concepts before attempting to read this book. The general linear hypothesis, generally regarded as the basis for the analysis of variance, is discussed next; again, the treatment is necessarily too condensed to permit thorough understanding by a beginning student. All readers should be cautioned to examine critically the next two chapters on randomization. The author takes a definite stand on the controversial problem of hypothesis testing in the analysis of variance, and his staunch defense of the so-called "randomization tests" places him in a minority position. Many readers will no doubt find cause to disagree with the philosophy expounded here: "We shall regard the inferences that we make as being inferences about the experimental units actually used, the extrapolation of these to a broader population being a matter of judgment in the present state of knowledge." Whether or not the reader accepts this philosophy, the value of the rest of the book remains essentially unaltered. If one prefers to think in terms of the infinite model he may do so, virtually unimpeded by further references to the randomization test (see page x of preface).

A complete coverage of conventional experimental designs (with the exception of systematic design) is contained in Chapters 9 through 29. The student of statistics will find occasional gaps in their logical development which he must fill by additional study; the experimenter will find some examples worked out in complete detail and a number of rules of thumb to guide him in the construction and analysis of the more complex designs. A certain amount of ability in algebraic manipu-

lations is required even to extract these rules of thumb.

A good general account of factorial systems and of confounding in prime power and mixed prime systems is presented in Chapters 13 to 19. Specifically, the arrangements for confounding in factorial schemes, the detailed description of the $2 \times 2 \times 3$ and of the $3 \times 3 \times 2$, and the general approach of Chapter 18 is excellent. Omissions include the adjustment of treatment means and the general treatment of missing data in confounded arrangements. In Chapters 20 to 27 the author's general treatment of fractional replication and of lattice designs is good. The relationship of confounding in factorial systems to fractional replication and to lattice designs is described.

An unusual and welcome feature of this statistical text is its treatment of the power of the analysis of variance. The tables of Tang are included in the appendix and are made use of regularly throughout the book in discussing the sensitivity of the various designs. Unfortunately, these tables are tabulated only for the five and one per cent levels of rejection which have come to be so universally accepted in the applied fields. And no suggestion is made in these discussions of the modern trend away from the fixed five per cent significance level.

The book contains its quota of omissions, misprints, and logical and notational inconsistencies, most of which are of only minor consequence. Some exceptions which are perhaps worth pointing out are: (1) The randomization test defined in Chapter 7, which consists of defining a critical set of randomizations, breaks down under the model employed in subsequent chapters where the error contains plot, or experimental unit, error and "... other errors due to variations in experimental technique, or extraneous factors." The randomization test is based solely on plot errors, and now with the addition of *continuous* errors caused by extraneous factors an assumption must be made concerning the density function of the errors before a rigorous test can be constructed. (2) The author's discussion of the principle of randomization stresses the difference between his formulation of the problem and that of J. Neyman. He makes no distinction between his formulation and that of R. A. Fisher, which gives the implication that their views on this subject are in agreement. It appears to the reviewers, however, that the author's ideas and those presented by R. A. Fisher in the prefatory note to his paper entitled "Theory of Statistical Estimation" are divergent. Also, the author's concept appears to be in disagreement with that of F. Yates and I. Zacapanay in their paper entitled "The Estimation of Efficiency of Sampling with Special Reference to Sampling for Yield in Cereal Experiments." (3) The reviewers feel that the problem of choosing an experimental error is treated too dogmatically. (4) The author fails to

approach the problem of degrees of freedom associated with the variance of treatment means in lattice designs; likewise, tests of hypotheses are ignored in connection with these designs.

Probably the most appreciative audience to this book will be the consulting statisticians, who should find it an extremely useful reference.

W. T. FEDERER AND D. S. ROBSON

Cornell University

Cooperatives in Norway, O. B. Grimley, Oslo, Norway: Published by the Cooperative Union and Wholesale Society, 1950. Pp. 178.

Farmers' Cooperation in Sweden. Ake Gullander, Ames, Iowa: The Iowa State College Press, 1951. Pp. 184, \$2.50.

The books, *Cooperatives in Norway* by O. B. Grimley and *Farmers' Cooperation in Sweden* by Ake Gullander are a distinct contribution to the cooperative field. Grimley covers the whole field of cooperatives in Norway, including consumer, agricultural, fishing, and housing cooperatives, while Gullander centers his major attention on farmers' cooperatives. Reading Gullander's book along with that of Marquis Childs, *Sweden the Middle Way*, will give one a balanced picture of cooperation in Sweden.

The background of cooperation in Norway and Sweden differs basically from that in America. These two Scandinavian countries have a combined population of 10,000,000, slightly more than the state of Illinois. Land holdings in Sweden average 22 acres; those in the United States, 153 acres. The American people represent all the countries of the world, while the population of Norway and Sweden is nearly homogenous. These contrasts help to explain why cooperatives in Norway and Sweden play a more vital part in the everyday lives of the people than in our own country.

In his discussion of Norwegian agricultural cooperatives, Grimley tells about the milk producers, the meat producers, farm purchasing pools, the Farmers' Bank and rural credit societies, the egg pool, and other forms of rural cooperation. Although he emphasizes agriculture, he is interested also in the more recent fishing cooperatives and in the very successful housing cooperatives.

A significant development is the Norwegian Meat Producers' pool. With its own slaughter-houses and sales societies, the pool has a membership of nearly 100,000 meat producers. According to Grimley, the pool has brought fair dealing to a market in which the buyer once held all the cards. About 75 per cent of the meat on the Norwegian market is distributed by the cooperative method.

Gullander tells about similar activities in Sweden. As in America,

many farmer cooperatives stemmed from the depression of the 1930's. In his introduction to Gullander's book, Professor Robotka of Iowa State College says:

"Swedish farmers have much the same objectives and aspirations as Americans. They tend to be little given to theorizing but to be intensely practical. Because of the stern necessities imposed upon them, they tend to exhibit considerable solidarity in coping with their common problems."

The author himself says concerning the value of cooperation: "Cooperation alone cannot make farming prosperous, but there is no doubt at all that cooperation is one of the most important means by which we can reach the target—fair returns and a fair standard of living for the farming population."

Although the Norwegian cooperatives follow the Rochdale plan and emphasize the consumer angle, the farmer cooperatives in Sweden, patterned after those in Denmark, center their attention on marketing problems. For example, following the lead of the Danes, Swedish farmers have specialized in a long lean hog suitable for bacon curing. This is slaughtered and cured in a cooperative bacon factory. This reviewer, going weekly to a local super-market, has often wondered if hog farmers in America might not well take a leaf from the Danes and Swedes and develop a hog which produces more lean meat. The usual answer to this is that Americans want the type of hog now raised. Do they?

The Swedish Consumers' Cooperative, K. F., was strong before the Farmers' Union. Conflicts between consumer cooperatives and agricultural cooperatives were natural. After negotiation, the two groups agreed on certain divisions of activities: production, dairies, packing plants belong to the farmers' cooperatives; retail distribution belongs to consumer cooperatives; processing belongs to both and requires special agreements. There seems to be greater cooperation between the consumer and producer groups in Sweden than in Norway.

Grimley states that in 1940 consumer cooperatives in Norway had 664 affiliated societies with a total trade of 218 million kroner. One-fourth of the people of Norway belong and membership is almost exclusively confined to rural people who hold paid-up shares in local societies amounting to 58 million kroner with nearly 49 million kroner in reserve. Local societies now have 235 productive enterprises including 126 bakeries, 89 sausage factories, fish diet, and savouries kitchen and 25 miscellaneous enterprises. Most local societies have only one shop but Oslo has 64.

In contrast to Norway, most consumer cooperatives in Sweden are urban. In his book, Childs states that in 1934 there were 380 coopera-

tive stores in Stockholm with a total of 3,990 for the country. Total membership in 1934 was 550,675 or about double that of Norway in 1948. Sweden has several mass production industries, while agriculture and fishing are the leading industries in Norway. With no anti-trust laws, one of the basic aims of consumer cooperatives in Sweden has been to break up monopolies. Flour, electric lamps, and cash registers have been the articles manufactured by cooperatives. Low-cost electricity and housing also have been attained by cooperative action.

Consumer cooperatives in America have made but little headway compared with those in Norway, Sweden, England, and some of the other European countries. This may be attributed to two things: our lack of economic pressure and our system of free enterprise.

In all countries, the economic force activating cooperatives has been economic need. Over the past 100 years, increases in productivity per worker and in purchasing power of wages have been greater in America than in Europe. With their trade unions and high productivity, American urban workers have been able to improve their living standards without resorting to the small savings resulting from cooperative purchase of foods and other commodities.

Competition in the processing and distribution of foods in America has been so intense that consumers get the benefit of low costs under a system of free individual enterprise. In Champaign-Urbana, Illinois, for example, competition between the super-markets of Eisner (a local chain), Kroger, and A&P is very keen. Each of these companies handles between 3,000 and 4,000 items in its super-markets. The situation prevailing here is similar to that in Seattle, Boston, Jacksonville, or San Diego. Spurious attempts to organize consumer cooperatives to handle food products have, with the exception of a few cases, failed.

As in Sweden, American farmer cooperatives have had an important influence on marketing and prices. Their fundamental objective of bringing greater returns to farmers for the products they sell has been attained primarily by increasing efficiency rather than by exacting monopoly prices. This greater efficiency has been made possible by placing more emphasis on returns and services to members and less on profits.

Many leaders of American farm cooperatives will feel that Grimley is an idealist and somewhat unrealistic in his attempts to get the farmer and consumer cooperatives of Norway to work together. Perhaps Grimley is right and American cooperative leaders are wrong. In any case, as American farmer cooperation matures, it may well give more thought to ways in which rural people may gain by working with city people.

Gullander, as an operating cooperative leader, writes of Swedish cooperation with all the relish and detail of participation. He is frankness

itself and does not mind telling a story at the expense of the Swedish people or admitting that the Swedish position during the last war was understandable but not very heroic. Some readers, however, may feel that Gullander devotes too much space to minor details.

Norway and Sweden, because of their compactness, have made excellent laboratories for cooperative experiments. As the United States enters the second half of the 20th century, its leaders may well give careful consideration to the human problems which have confronted Scandinavia and to the methods employed in solving them.

R. W. BARTLETT

University of Illinois

Range Management, Principles and Practices, A. W. Sampson, New York: John Wiley and Sons, Inc., 1952. Pp. xiv, 570, \$7.50.

Grazing of domesticated livestock upon native or naturally grown forage plants is one of the oldest activities of man, if, indeed, it does not mark the way in which man emerged as man. But grazing as a field of scientific inquiry scarcely extends back for more than 50 years. In that field, no name stands out more conspicuously for length and quality of contribution than does that of A. W. Sampson. One of the "old masters," his professional activities began before 1910, and by the middle 1920's his three classic texts, *Range and Pasture Management*, *Native American Forage Plants*, and *Livestock Husbandry on Range and Pasture*, had been printed. Range management is a growing and vigorous professional field today, and most present-day practitioners owe much, directly or indirectly, to Sampson.

The present book is the capstone in this long and distinguished career. In the words of the author, it "has been a long time in the making." Preliminary versions have undergone use, trial, and revision in his classes for many years. The result is a comprehensive treatment of the subject. Twenty-four chapters are grouped into four parts: Range Management in Perspective, Native Range Forage Plants, Improvement and Management of Range and Stock, and Protection of Land Resources and Range Livestock. Many photographs, drawings, and tabulations add greatly to the exposition of the subject.

To readers of *This Journal* not familiar with range management, it should be pointed out that as a field of knowledge it is roughly comparable with agronomy, animal husbandry, and the like. It is an applied science, as well as an art. The present book contains a great deal of specific information about native forage plants and their use. It is based rather solidly upon the best scientific knowledge of plant and animal life, and draws heavily upon applied research in this field.

The excellent chapters on artificial reseeding, natural reseeding and systems of grazing, and control of noxious woody vegetation on range lands are particularly timely at this time when attention is directed toward the improvement of our natural grazing resources and expansion of livestock production. The chapters on erosion and wild life recognize the part of range management in a broad program of conservation. The short chapter on the administration of public grazing lands raises a number of nationally important questions on policy and administration, including the question of grazing fees. Readers will find the chapter stimulating, but will have to bring up-to-date the figures cited on grazing fees.

The book is an excellent presentation of the problems of range management—those related to the welfare of the forage crop and the soil as distinguished from the grazing management—and the care and handling of livestock on the range. Each chapter is supported by a comprehensive and soundly selected list of references.

To this reviewer, the disappointing feature is its limited economic analysis—indeed, it frequently does not show the economic significance of the facts and data it presents. There are, to be sure, interesting items and observations about economic matters, such as meat consumption per capita, ratios of livestock numbers and human populations, marketing livestock, economic considerations in choosing a ranch, and the like. But they are haphazard and a series of interesting facts, not a coordinated system of analysis. However, it may be asking too much of a good book in range management that it also be a good economics book. There is still a need for much more analysis of the economics of range management, and the author of this difficult and still unavailable treatise will find a wealth of background information and many stimulating suggestions in Professor Sampson's exhaustive treatment of range management.

MARION CLAWSON

Bureau of Land Management

NEWS NOTES

A. J. Ashe has taken a position as Commodity Price Analyst in the Economic Research Department of Armour and Company at Chicago.

William B. Back joined the staff of Oregon State College on April 1 as Assistant Professor of Agricultural Economics. Dr. Back completed his doctorate in Agricultural Economics at Iowa State College in March. He will teach and research in Production Economics.

John D. Baker completed his Ph.D. at Purdue University in June, 1952, and accepted a position as Research Economist with the Longstreet-Abbott market counseling service in St. Louis.

Raleigh Barlowe has been promoted to Professor at Michigan State College.

George W. Barr, serving as Regional Economist with the Economic Commission for Latin America, has had his leave from the University of Arizona extended for the next fiscal year.

Ward Bauder, University of Kentucky, is a visiting professor of Rural Sociology in the University of Illinois Department of Agricultural Economics for the summer session.

James W. Birkhead (formerly BAE) and Kenneth L. Bachman, BAE, are serving as consultants with the National Security Resources Board on a project entitled, "A Plan for Improved Utilization of Rural Manpower Resources."

Dale Butz has been named as project leader in extension marketing and consumer education work at Michigan State College. A. B. Love, formerly in charge of consumer education, has been granted a disability retirement.

Bernard J. Bowlen has resigned from Kansas State College to do graduate study at Iowa State College.

Karl Brandt, Economist and Professor of Agricultural Economics in the Food Research Institute of Stanford University, was in western Europe during January and February. Mr. Brandt visited at the University of Göttingen, and the group of agricultural research institutes at Völkenrode, Germany.

C. B. Brotherton, on leave from his position as Assistant Professor of Agricultural Economics at Montana State College, is serving as a navigator with a B-29 Squadron based on Okinawa.

Richard Butler has rejoined the staff of the Bureau of Agricultural Economics, where he is working in the Statistics Service Section. He transferred back to the Bureau from the Department of the Interior.

L. L. Boger has been promoted to Associate Professor in the Department of Agricultural Economics at Michigan State College, effective July 1.

Emery N. Castle has resigned from Kansas State College to accept the position as Assistant Agricultural Economist of the Federal Reserve Bank of Kansas City on September 1. During the summer he will supervise a research study on the agriculture of South Central Kansas, which is being conducted as a joint project by the Kansas Agricultural Experiment Station and the Bureau of Business Research of the University of Kansas.

Grover C. Chappell, who has been taking graduate work at the University of Minnesota, has accepted a position in the Economic Research Department, Armour and Company, Chicago.

Clifton B. Cox of Purdue University was awarded one of the Case Institute study grants and attended the Institute of Economics held at Case Institute in Cleveland during June and July, 1952.

Samuel L. Crockett has transferred from the Production and Marketing Administration, U. S. Department of Agriculture, to the Division of International and Functional Intelligence, Department of State.

Joseph S. Davis, Director of the Food Research Institute of Stanford University attended a meeting of a special committee of the Twentieth Century Fund in New York City on May 23 in respect to an extended study of the financial problems of the elderly and aged. As of September 1, 1952, Dr. Davis will become an emeritus member of the University Faculty. His residence address is 691 Mirada, Stanford, California.

Thomas E. Doak received his Ph.D. from Cornell in 1951 and is now a Price Analyst with Longstrett-Abbott and Company, a commercial research firm in St. Louis, Missouri.

William Drew, who completed his preliminary work toward a doctor's degree at Vanderbilt, replaced Arthur Van Dyke as Extension Marketing Specialist on Fruits and Vegetables at the University of Connecticut.

Everett E. Edwards was awarded, posthumously, a Superior Service Award by the Department of Agriculture on May 15, "for delineating the history of American agriculture as a field of research and for stimulating an understanding of the evolution of agricultural problems." He died on May 1 after an extended illness.

Russell C. Engberg, Chief, Economic and Credit Analysis Division, Farm Credit Administration, Washington, D.C., was on a special assignment for the Mutual Security Agency during April, May, and June. He met with a group of credit specialists in several countries, including France, western Germany, and Austria.

Helen C. Farnsworth, Economist and Professor in the Food Research Institute of Stanford University, will spend the period from mid-June to September 1 in western Europe for the purpose of obtaining additional information on the food problems faced by the European countries during and immediately after World War II.

Ray A. Goldberg, who received his Ph.D. at the University of Minnesota in June, is in the grain business with headquarters at Fargo, North Dakota.

William A. Green, Division of Land Economics, Bureau of Agricultural Economics, has transferred from the Lincoln office of the Bureau to the Upper Darby office. He will work on economic phases of the development of land and water resources of the New York-New England area.

John J. Haggerty is the new Head of the Office of Foreign Agricultural Relations.

Claude C. Haren is on extended military furlough from his position as Agricultural Economist in the Division of Land Economics, Bureau of Agricultural Economics.

Dale Hathaway has been promoted to Assistant Professor in the Department of Agricultural Economics at Michigan State College, effective July 1.

Harold F. Hollands returned to his position as Professor of Agricultural Economics at Oregon State College on August 1. During the past three years, Dr. Hollands has been on a leave of absence to serve as an Agricultural Economist with the Mutual Security Administration in Paris, France. He will be teaching and researching in Agricultural Marketing.

Dr. Charles W. Hauck, 60, Professor of Agricultural Economics in the College of Agriculture at Ohio State University from 1926 to 1948, died July 14 in the

University Hospital at Columbus, Ohio. Dr. Hauck joined the Extension Service of the U.S.D.A. in 1948 to direct Extension fruit and marketing work. He had recently retired and was living in Columbus, Ohio.

Stewart Johnson of the Department of Agricultural Economics, University of Connecticut, began a six months' leave of absence on February 1 to study milk distribution and pricing.

Robert C. Jones of the Technical Assistance Administration of the United Nations will visit the Caribbean area and Mexico for the purpose of examining rural community organization and development projects.

William O. Jones, Associate Professor of Economics in the Food Research Institute of Stanford University, has received a Guggenheim Fellowship for a study of the economics of production, distribution, and consumption of the manioc root.

George Judge, who completed his preliminary work toward his doctor's degree at Iowa State College, joined the staff of Agricultural Economics at the University of Connecticut in August as Assistant Professor. He is working on poultry marketing research and extension.

Arthur H. Kantner, who received his Ph.D. degree from Cornell in June, became Agricultural Economist with the Federal Reserve Bank of Atlanta, Georgia, effective July 1, 1952.

Luther H. Keller has been appointed jointly as an Assistant Extension and Assistant Research Economist in the Department of Agricultural Economics, University of Tennessee.

Paul L. Kelley, Assistant Professor at Kansas State College, will be on sabbatical leave during the 1952-53 academic year. He will be at Iowa State College for graduate study.

Riley H. Kirby has accepted a position with the Office of Foreign Agricultural Relations in Washington, D.C.

Joseph Koudele will continue on leave from Kansas State College for graduate study at Michigan State College.

Robert Kramer, who received his Ph.D. degree at Michigan State College in June, has been promoted to Assistant Professor in the Department of Agricultural Economics at M. S. C., effective July 1.

Robert J. Krueger received his Ph.D. from Cornell in February and is now Associate Professor in Poultry Marketing Extension at Virginia Polytechnic Institute.

E. Lee Langsford, Bureau of Agricultural Economics, was among those receiving Superior Service Awards in the Department of Agriculture on May 15, 1952.

John McCoy will continue on leave from Kansas State College during the first semester of the 1952-53 academic year for graduate study at the University of Wisconsin.

Preston E. McNall, Professor of Agricultural Economics in farm management, was on leave from the University of Wisconsin the latter part of the spring semester to work with the regional office of the Wage Stabilization Board in Chicago on the problem of agricultural wages and labor.

Clarence A. Moore has resigned from Kansas State College to do graduate study at the University of Chicago.

W. R. Morrison of the Department of Rural Economics and Sociology, University of Arkansas, is conducting a marketing study in the Republic of

Panama as a part of the Point Four University of Arkansas Agricultural Mission to Panama. Morrison will inventory and analyze the existing marketing structure for agricultural products in the Republic and make recommendations for improvements.

Professor E. F. Nash of the Department of Agricultural Economics, University College of Wales at Aberystwyth, is a Visiting Professor of Agricultural Economics at the University of Illinois. He and Dr. C. L. Stewart are sharing instruction in the graduate course in International Comparative Agriculture.

Robert E. Olson, who has been a Research Fellow, University of Minnesota, is now with the Division of Marketing and Transportation Research, Bureau of Agricultural Economics.

Russell O. Olson, Division of Farm Management and Costs, Bureau of Agricultural Economics, who has been working on cooperative research at Iowa State College, will move to Columbus, Ohio, on July 1, 1952, to engage in similar cooperative work with Ohio State University.

Kenneth H. Parsons, University of Wisconsin, is spending three months in India as a Point Four Consultant on matters of land tenure adjustment, credit, and other agricultural matters.

Walter W. Pawson, Division of Farm Management and Costs, Bureau of Agricultural Economics, will change his headquarters from Portland, Oregon, to Pullman, Washington, on July 1, to engage in cooperative research on the Economics of Conservation with the State College of Washington.

E. A. Perregaux's leave of absence was extended in order for him to continue with the Mutual Security Administration as Chief of the Farm and Agriculture Department, Special Mission to France.

Weber H. Peterson, formerly Professor of Agricultural Economics at Clemson College, is now associated with the Office of Price Stabilization with headquarters at Richmond, Virginia.

Richard B. Rainey has transferred from the Bureau of Agricultural Economics to the Economic Stabilization Agency. He is working in the Dallas office.

F. J. Reiss, University of Illinois, began serving as Regional Coordinator on a North-Central Regional research project on getting families established in farming, effective July 1. The project is sponsored by the North-Central Land Tenure Committee.

Lawrence A. Reuss, Agricultural Economist, Bureau of Agricultural Economics, has transferred from Logan, Utah, to Gainesville, Florida, to work on land economics problems in the Southeast.

K. L. Robinson, after completing graduate work at Cornell, Oxford, and Harvard, has joined the staff at Cornell as Assistant Professor. He will teach and conduct research in Agricultural Economics with special reference to agricultural policy.

Charles E. Rogers, formerly Head of the Journalism Department at Kansas State College and later at Iowa State College, and from 1946 to 1951, educational relations officer of FAO, has been appointed supervisory editor of research publications in the Bureau of Agricultural Economics and joint editor of *Agricultural Economics Research*.

R. C. Ross, University of Illinois, is a Visiting Professor at the University of Arkansas for the second period of the summer session. He is offering two courses in Farm Management.

Elizabeth Ruiz has transferred from the Bureau of Agricultural Economics to the Office of Price Stabilization.

Vernon W. Ruttan, formerly Research Associate, Department of Economics, University of Chicago, has joined the staff of the Tennessee Valley Authority as Industrial Economist in the Division of Regional Studies.

Lester Sartorius, formerly Research Associate, Division of Agricultural Economics, University of Minnesota, has joined the staff of the School of Commerce, University of Illinois, as Assistant Professor.

Robert W. Schoeff resigned from the research staff of Purdue University to accept a position as Research Economist in the Commercial Research Department of Armour and Company in Chicago, effective March 1, 1952.

John C. Scholl, Division of Field Crop Statistics of the Bureau of Agricultural Economics, has gone to the State Department to do statistical work in Central and South America.

Frank S. Scott, Jr., has joined the staff of the University of Nevada as Associate Research Economist in the Agricultural Experiment Station.

Elmer W. Searls, Assistant Professor in Milk Marketing Extension at Cornell, accepted a position as Executive Secretary of the Northern New Jersey Milk Dealers' Association at Newark, New Jersey.

Raymond E. Seltzer will continue as Acting Head of the Department of Agricultural Economics, University of Arizona, during the extended leave of absence of Professor George W. Barr.

Calvin C. Taylor has transferred from the Georgia Agricultural Experiment Station to the Farm Taxation and Local Government Section of the Division of Agricultural Finance, Bureau of Agricultural Economics.

Robert L. Tontz, Assistant Professor of Agricultural Economics at the Oklahoma A & M College, received the Ph.D. degree from the same institution in May.

Gale Ueland joined the staff of the Division of Agricultural Economics, U. S. Department of Agricultural Extension Service, on May 12. Miss Ueland fills the position of Extension Economist in Marketing in the Consumer Education and Marketing Information Section recently made vacant by the resignation of Miss Loa Davis. For the past two years Miss Ueland has been associated with Dr. Carlton Wright on the Extension Food Marketing Program for the metropolitan area of New York.

Harold R. Walker, formerly Head of the Hay and Feed Supply Section, Division of Field Crop Statistics, Bureau of Agricultural Economics, is now Head of the Grain Section of that Division. His place in the Hay and Feed Supply Section has been taken by Thomas J. Kuzelka.

Harry R. Wellman, Chairman of the Division of Agricultural Economics and Director of the Giannini Foundation of Agricultural Economics, will succeed Claude B. Hutchison as Vice-President-Agricultural Sciences at the University of California, effective July 1.

Quentin West joined the Inter-American Institute of Agricultural Sciences at Turrialba, Costa Rica, to work as Land Economist in the Northern Andean Region.

John W. White, Department of Rural Economics and Sociology, University of Arkansas, is coordinating in conducting a marketing study in the Republic of Panama as a part of the Point Four University of Arkansas Agricultural Mission to Panama.

Odin Wilhelmy, Jr., who has been Assistant Professor in the School of Nu-

trition at Cornell, has taken a position as Agricultural Economist with Battelle Memorial Institute in Columbus, Ohio.

Dr. Willard F. Williams completed his Ph.D. at Purdue University in June, 1952, and accepted a position as Marketing Specialist with the California Department of Agriculture.

C. Peairs Wilson, who has been supervising research and teaching in Livestock Marketing, will become Assistant Director of the Kansas Agricultural Experiment Station on July 1.

Fulbright Awards

Under the 1953-54 program of University Lecturing and Advanced Research Awards of the Fulbright Program there are three lectureships in Agricultural Economics—one each at the College of Agriculture and Veterinary Science, Copenhagen, Denmark; the Agricultural College, Vollebekk, Norway; and the College of Commerce and Economics, Baghdad, Iraq.

Openings for both lecturers and research scholars in other branches of agriculture are listed under several country programs.

The awards which, in the main, are tenable between September, 1953 and June, 1954, are payable in foreign currencies and include a maintenance allowance and roundtrip transportation for the grantee. Closing date for making application is October 15, 1952.

Requests for detailed announcements and application forms should be addressed to the Conference Board of Associated Research Councils, Committee on International Exchange of Persons, 2101 Constitution Avenue, Washington 25, D.C.

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